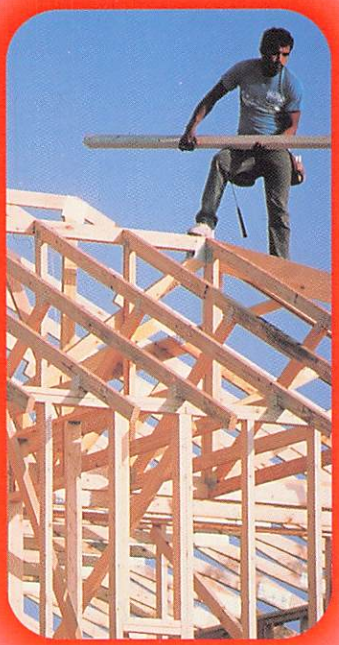
CA-SuperProject®

PROJECT MANAGEMENT FOR THE REAL WORLD



USER GUIDE

FOR WINDOWS AND OS/2

COMPUTER® ASSOCIATES

Software superior by design.

CA-SuperProject™

For Microsoft Windows and IBM OS/2

Version 3.0

User Guide

March 1993

COMPUTER ASSOCIATES®
Software superior by design.

Printed on Recycled Paper

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Chapter 1
Introduction

This chapter introduces you to the *User Guide*. The *User Guide* provides all the information you need to understand and use the CA-SuperProject program for day-to-day operations.

If you have just purchased CA-SuperProject, refer to the *Getting Started Guide* first. The *Getting Started Guide* tells you how to install SuperProject on your computer and set up your company data files. It also includes lessons to help you learn the program. After you have set up your CA-SuperProject system, you can still use the *Getting Started Guide* for information about changing program options and setting up printers.

To practice setting up and using CA-SuperProject, refer to the *User Guide*. It provides step-by-step lessons you can follow to create and use a complete set of practice data.

How to Use this Guide

Refer to this *User Guide* for information on understanding and using SuperProject, as follows:

Chapter 2, Preplanning, contains suggestions for determining what must be done and who can do it, identifying major milestones and deadlines.

Chapter 3, Building and Scheduling, describes basic building and scheduling features available in Beginner Mode.

Chapter 4, Advanced Planning: Refining the Plan, demonstrates how to use the various Views to build, change and schedule your product.

Chapter 5, Project Tracking, describes tracking and controlling progress once the project is underway.

Chapter 6, Advanced Features, describes the Date and Account Outlines, presents basic procedures for designing your own reports and charts, and introduces Earned Value Analysis for government contractors.

Appendix A, Calculation Error Messages, contains a list of Calculation Diagnostic error messages and the appropriate corrective actions to take when they display.

Appendix B, Glossary, is an alphabetical list of terms relating to CA-SuperProject.

Appendix C, Related Reading, can give you a deeper understanding of the theory and practice of project management.

The **Index** is an alphabetical list of topics in this manual, with corresponding page-number references.

Where to Now?

If you have already installed CA-SuperProject on your computer, read the rest of this guide for information on day-to-day operation of the program.

If you have just purchased SuperProject, see the *Getting Started Guide*. It describes the important features of the program, lists the main steps in setting up and preparing to use the program, and outlines the contents of the *Getting Started Guide*.

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Chapter 2
Preplanning

What's in This Chapter?

Some project managers like to "brainstorm" at the keyboard. They sit down with a rough idea of tasks to accomplish, then enter them in approximate order. When a new task occurs to them, they enter it after a related task. They may add subtasks under other tasks, or enter a new task over a group of existing tasks so they become subtasks.

Others prefer a structured, "top-down" approach. They like to map out the broad project structure first, perhaps as several phases. Then, they break the phases down into tasks and subtasks—whatever level of detail their project requires. This is the approach we take in the following chapters, although CA-SuperProject supports other work styles as well.

However you like to work, you'll probably start your new project with preplanning—determining what must be done and who can do it, identifying major milestones and deadlines.

This chapter contains suggestions for preplanning. Then you'll have all the information you need for the next step—building and scheduling.

Guidelines for Preplanning

Preplanning takes some effort, but it is sure to pay off later. Whatever your work style, these preplanning steps will help you focus your thoughts:

1. Define the project—its main objective, available resources, time span, and general budget.

2. Break the work into phases.

3. Break the phases into tasks.

4. Estimate how much time each task needs.

5. Think about task sequence—which tasks need to start or finish before others can start or finish.

6. Match available resources to tasks.

7. If resources are assigned to several tasks, consider how to divide their workload. Should they complete one task before starting another, or will they work on more than one task every day?

Defining the Project

First, define the project by asking yourself the following questions:

- What objective do I need to accomplish?
- Who is available to perform the work?
- When does it need to be finished?
- What funds are available?

A comprehensive project definition keeps you from "spinning your wheels," which can happen if you do not consider all factors and limitations.

Here are some examples of defined projects:

- Send 5000 direct-mail flyers by September 12, keeping the total costs under $4000, using Marketing personnel.

- Hold the annual Shareholder's Meeting sometime during the last week of April, keeping costs to an absolute minimum. All employees can participate as needed.

Usually, you'll have limitations on funds, time, and resources. Successful planning requires a balance of these three elements.

Identifying Phases

The next step is breaking the project down into logical phases. If your company already has a formal Work Breakdown Structure (or WBS), great! You can use it to divide the work into phases. If you have never worked with a WBS, it is simply a way of defining your project—perhaps by development phase or department responsibility.

There is no standard way of designing a WBS; each company decides what works best. For example, if your company's charter is to build a better mousetrap, your work flow might look like this:

Design, Prototype, Test, Revise, Produce, Market, Sell, Ship...

However, that WBS would not work for a construction firm! Their WBS might look more like:

Blueprint, Foundation, Frame, Electrical, Plumbing, Roof, Paint...

If your company is a government contractor, you probably have a numbering system for each phase and task of your project. You can use it in CA-SuperProject. Chapter 6 of the *Reference Guide* gives instructions on using the WBS Mask.

Breaking Phases into Tasks

After you have determined the main phases your project must go through from planning to completion, break each phase into a series of tasks.

A project to design and manufacture the ultimate racing bicycle has these phases and tasks:

Project: *Manufacture New Racing Bicycle*

1. Design
   Build Market Profile
   Analyze Competition
   Finalize Specs.

2. Prototype
   Select Engineering Team
   Acquire Materials
   Build Prototype Model

3. Test
   In-Plant Tests
   Computer Simulation
   Road Tests

4. Modify
   Review Test Feedback
   Change Processes
   Change Materials

5. Production
   Hire New Workers
   Expand Plant
   Mfg. (5000 Units)

Notice that each phase encompasses a number of tasks; the more familiar you are with these activities, the more accurate your initial plan will be. After considering the basic tasks in your project, you can expand your plan to include assigned personnel, time requirements, and task prerequisites.

Matching Resources to Tasks

Now that you know what has to be done, who is going to do it? Who and what are your available resources?

A resource is someone or something that performs a task or is needed for the task to occur. A resource can be an employee, funds, machinery, materials and supplies, a vehicle, a facility, a consultant, a department, or a business.

To assign the appropriate resource to each task, you must be familiar enough with the work to evaluate the skills each task requires, and the ability of all available resources. Other considerations are current workload and costs/ wages. Obviously, you want to optimize the time of your more expensive resources. Remember—planning means balancing funds, time, and resources. You will find that when one of these three factors is restricted, the other two become more critical to finishing the project.

In CA-SuperProject, all resource—even materials—have records identifying work hours, hourly rate, associated costs, and so on. If your company produces some of its own materials, you can track materials produced and used over time to keep a running inventory of available goods. You will want to gather such detailed information for final planning, but you just need rough data for now.

After you have taken stock of who can help, what they can do, and what they cost, you're ready to assign resources to the appropriate tasks.

Estimating Task Durations

Next, determine the time span for the project. Time plays many roles in your project—the entire project takes an elapsed time from beginning to end, each task takes a certain number of workdays or hours, and tasks must be scheduled according to the resource's available hours.

Sequencing Tasks

After you've defined who is doing what, and for how long, arrange the tasks in a logical order (when *do they occur?*).

Some tasks can happen at the same time, concurrently. For example, a marketing group can accept bids to print a brochure before it is completely designed.

Other tasks must occur sequentially, in a certain order. The marketing group cannot print a brochure before it is designed; a maintenance department must repair safety hazards before making cosmetic improvements.

CA-SuperProject offers two ways to arrange sequential tasks—by assigning priorities and leveling your project, and by entering dependency links.

If tasks are tied to a certain start or finish date, you can assign "Must dates" that override other sequence settings.

Ranking Tasks by Priority

Priorities help schedule tasks in order of importance during resource leveling. With the proper entries, CA-SuperProject schedules high priority tasks before it schedules low priority tasks. When leveling, CA-SuperProject interrupts low priority tasks with higher priority tasks when the Calculation Option *Split Resource Assignment* is active.

You can enter priority numbers for each task, from 1 to 999. It may help to take some time during preplanning to think about the importance of each task compared to the others. You may want to divide your tasks into groups—Most Important, Average Importance, Least Important—or just decide which ones are particularly important. "Setting Task Priorities" in Chapter 5 tells how to enter priorities.

Sequencing with Links

Dependency links determine task sequence when activities must start or finish in a certain order. For example, you cannot test a software module until that part of the program is written; you cannot complete an inspection until construction is done.

Consider project tasks and attempt to determine a logical task sequence. Think about tasks that must occur in a certain order so you can link them later.

Identifying Must Dates

You may have tasks that must occur on, before, or after specific dates. You can easily schedule these fixed tasks with CA-SuperProject by setting *Must* dates for meetings, trips, and other deadlines.

Consider whether your project has any *milestone* dates—for example, "Ready to Typeset by June 29"—or absolute deadlines, such as "Deliver to Seminar on April 12."

Milestones and deadlines become *project constraints* when tied to a definite date. Your job will be easier if you keep constraints to a minimum and let CA-SuperProject do the scheduling based on priorities, links, and duration estimates.

Dividing Resource Workloads

The task links previously discussed are ways to schedule tasks. Let's talk about scheduling *resources*, and how each resource's schedule can affect the project finish date. If a design team, for example, is assigned only one task—no problem! The team works until the job is done. If a team—or any resource—is assigned two tasks, it is decision time. Does the team complete its first task before starting the next, or does it spend part of each day working on both tasks? Is the work divided evenly, or does the team spend more time each day on one task?

CA-SuperProject lets you control how resource time is allocated among two tasks, or eight, or more! It helps to think about resource allocations during preplanning. You can locate and resolve potential resource conflicts before you touch the keyboard.

What Next?

At this point, you have done enough preplanning. You will discover any missing information as you enter data into CA-SuperProject. It is time to turn to the next chapter and build the project!

Summary

Before entering data into CA-SuperProject, it is a wise idea to do some preplanning. This chapter showed you how to define the project, identify phases, break phases into tasks, estimate task durations, schedule tasks, and schedule resources.

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Chapter 3
Building and Scheduling

What's in This Chapter?

Building a project consists of entering each project activity into the program. You map out the basic project structure, then add the details—task durations, resource assignments.

Scheduling a project involves time management—setting aside the time needed to execute the project. There are two aspects of scheduling: task scheduling and resource scheduling.

You schedule tasks by linking dependent tasks, and "fixing" task dates for meetings, trade shows, and so on.

You schedule resources by customizing each resource's daily schedule. This includes scheduling around an employee's vacation and sick days, and may involve dividing a resource's daily time among several tasks. It also requires setting priorities when several tasks are vying for a resource's time, and balancing resource workloads.

This chapter describes basic building and scheduling features available in the Beginner mode. When you are familiar with these techniques, you will be ready for the Expert mode methods outlined in Chapters 4, 5, and 6.

Views for Building and Scheduling

There are several Views in Beginner mode designed to help streamline your project's schedule and isolate problem areas:

Task Outline with Gantt column
Resource Outline with Cost/Resource Chart
PERT Chart
Work Breakdown Chart (using WBS and Account Codes)
Project and Resource Calendars

The *Getting Started Guide* contains illustrations. In the following sections, you will learn which ones to display for entering data and checking your schedules.

Guidelines for Building and Scheduling

Here are guidelines for project building and scheduling—entering basic task information, assigning resources, and adjusting task/resource assignments:

1. Select **View,Calendars** from the menu to display the Project Calendar. Enter company holidays and the standard workday on the Project Calendar.
2. Build the basic structure of your project:

   • Enter the project phases, or headings. We recommend you use the Task Outline for this.

   • Define the details of each phase by entering tasks under each heading on the Task Outline and Work Breakdown Chart.
3. Finish entering task information:

   • Enter Estimated Durations and any necessary fixed dates.

   • On the Task Outline or PERT, link dependent tasks to show which tasks must finish before others can start.
4. Assign resources to each task.

5. Finish entering resource information:

   • Enter resource vacation time on the Resource Calendars.

   • Enter resource Allocations per Day to divide resource workdays among assigned tasks.

6. Check and revise task scheduling:

   • Review project start and finish dates and the dates of each task on the Task Outline.

   • If the project start or finish date is unacceptable, review the project's critical path for possible ways of finishing earlier.

   • Verify that all tasks with fixed dates are scheduled appropriately. If these *Must* dates cannot be met, review the schedule for alternatives.

7. Check and revise resource scheduling:

   • Check each resource's workload on the Resource Outline with Cost/Resource Chart.

   • If resources are overscheduled, determine which tasks are vying for the resource's time, then resolve the problem to suit your company's priorities.

   • If resources are unscheduled for part of the time, adjust their Allocations per Day or assign them to other tasks if possible.

8. When the schedule looks the way you want it, save it as a baseline for later comparisons with actual and scheduled activity.

9. Communicate the plan with reports and graphs.

This is an on-going process; as your project develops, you will need to keep checking for problems and schedule around them. You can revise the schedule at any time and set the baseline again if necessary.

The next sections explain these steps in detail. Remember—CA-SuperProject's flexibility allows many variations on this procedure. As you become more familiar with the program, you will discover the method that works best for you.

Entering Company Holidays

Start building your project by entering company holidays on the Project Calendar. When you enter holidays, you are telling CA-SuperProject not to schedule work on those dates.

Here is part of a Project Calendar showing July 4th as a holiday:

Calendar For: BIKER.PJ							
1991	Sun 0.0	Mon 8.0	Tue 8.0	Wed 8.0	Thu 8.0	Fri 8.0	Sat 0.0
Jun Jul	30 WKND	01 24.0	02 24.0	03 24.0	04 Holiday	05 24.0	06 WKND
Jul	07 WKND	08 8.0	09 8.0	10 8.0	11 8.0	12 8.0	13 WKND

Procedure: To enter a holiday:

1. Select View,Calendars from the menu.

2. Go to the target date, using the mouse or Arrow keys and **PgUp/PgDn** keys.

3. Type the name of the holiday and press **Enter**. Or, press **F3** to create a "generic" project holiday on that date, identified by the word Holiday.

Example: To set aside January 1st as a company holiday, scroll the calendar to January, then point to the 1st. Type **New Years** and press **Enter**.

A Shortcut

As a shortcut, select **Edit,Find Date** from the menu (or press **Ctrl-F**). Enter the date—for example, **01-01-91**—to reach the right date block. Then, press **F3** or enter the holiday name.

Saving Company Holidays

This procedure only makes January 1st a holiday for the current project. Once you have entered all of your company's holidays, you can save them as a group to use for all of your projects. Select **Edit,Save as Default**. You can accept the default filename SYSHLDYS.HOL, or enter another name. Then, you can select **Edit,Load Default** from the menu to load the default holidays into a new project.

For more about the Project Calendar, see Chapter 6 of the *Reference Guide.*

Creating Project Levels

How is your project structured? If the project is organizing an office party, it may consist of several unrelated tasks which must be finished by Friday at 5 p.m.:

> *Schedule a room, coordinate furniture arrangement, cater food and beverages, decorate, prepare invitations, hire a DJ, coordinate janitorial services*

There is not a logical way to group these tasks so that some are subtasks of others. They are all on the same task level.

If you are developing a new product line, though, you will find you have many tasks which fall into related clusters. Using a work breakdown structure—or multilevel task hierarchy—is one way of defining and grouping these tasks.

Example: In preplanning, we broke our sample project into phases and tasks:

Project: *Manufacture New Racing Bicycle*

1. Design
   Build Market Profile
   Analyze Competition
   Finalize Specs

2. Prototype
   Select Engineering Team
   Acquire Materials
   Build Prototype Model

3. Test
   In-Plant Tests
   Computer Simulation
   Road Tests

4. Modify
   Review Test Feedback
   Change Processes
   Change Materials

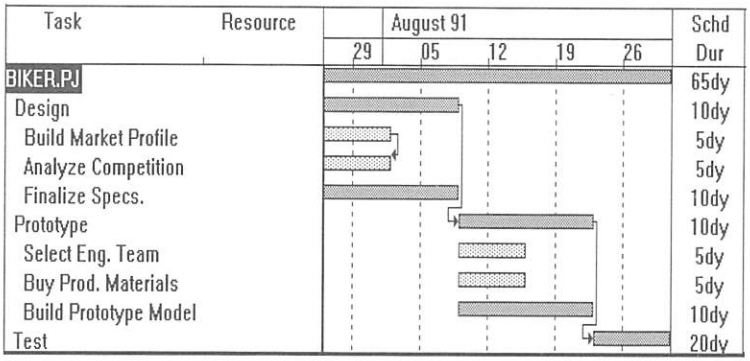
5. Production
   Hire New Workers
   Expand Plant
   Mfg. (5000 Units)

You can use CA-SuperProject without a work breakdown structure (WBS). However, using one helps you organize your project; it is easy once you understand the basic relationship between headings and tasks.

Headings and Tasks

A task is a single operation that occurs over the course of the project. A heading is a logical grouping of tasks. In CA-SuperProject, any task broken down into finer subtasks is a heading.

Example: In this project, Design and Prototype are headings while Build Market Profile and Select Eng. Team are subordinate tasks:

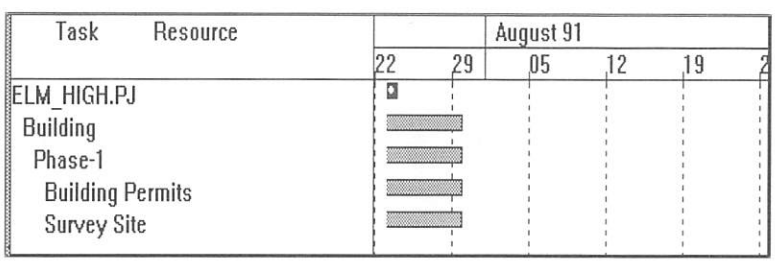


Headings on the View screens are distinguished from tasks. On the Task Outline, headings are a step to the left of their subordinate headings and tasks, and the subordinate headings and tasks are indented to show lower levels.

You create headings by first creating tasks, then promoting tasks above others or demoting tasks beneath others. Each promotion or demotion creates another level in the project structure.

You probably sketched out a project structure during preplanning. Let us say you want to organize your project by phase. You can enter phases into CA-SuperProject, then add subordinate tasks later.

Example: In this illustration, Building is a heading at the first level below the project name, Phase-1 is a heading at the second level, and Building Permits is a task at the third level.



Each phase can have numerous task levels, although projects of average complexity typically have only two or three. If your project has many tasks and requires precise scheduling, you will probably have more levels than if the project has only a few tasks, or if the tasks are mostly unrelated.

Up to 11 task levels display on the Task Outline, more on the Work Breakdown Chart. You can use virtually any WBS numbering system to identify them. See "WBS Mask" in Chapter 7 of the *Reference Guide* for details.

We recommend using the Task Outline for entering headings and tasks. After you have entered a task, it is easy to promote or demote it to another level or move it to another heading following the guidelines in the next section.

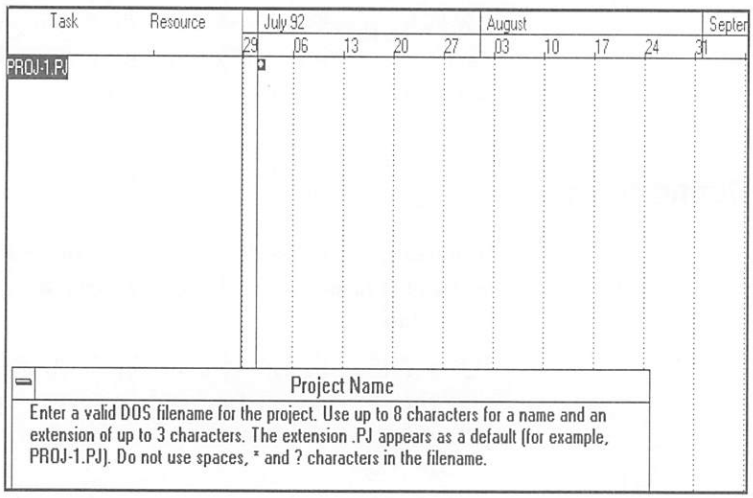
Procedure: Follow these steps to enter tasks and define project levels:

1. Name the project.
2. Enter top-level tasks, or phases.
3. Enter subordinate tasks beneath each phase.
4. Promote and demote tasks to form a multilevel project structure.

The next sections describe each step.

Naming the Project

Select **View,Task Outline** from the menu to display that screen. It is arranged in columns (for various project fields) and rows (for your entries). Initially, it contains only the default project name—**PROJ-1.PJ**:



The Help screen at the bottom describes the Project Name field and how to change it:

1. If the default project name is not already highlighted, point to it.

2. Type your project's name in its place (up to eight characters, not counting the extension—.PJ). The name must be "legal" for DOS.

3. Press **Down Arrow** to move to the next line, ready for task entry.

   Tip: Assist Mode - When you first start using CA-SuperProject, it is in Assist mode. Information automatically displays for each highlighted field. See "Assist Mode" in the *Getting Started Guide* for more about this feature. Press **Esc** at any time to turn it off; select **H**elp,**A**ssist mode from the menu to turn it back on. We have simplified other illustrations by showing them without the Assist mode help screen.

If you pressed **Enter** instead of **Down Arrow** in Assist mode, the next column available for data entry is highlighted. The help screen at the bottom describes this field. You may continue with the next section on entering tasks, or explore the other basic

fields by pressing **Enter** until the highlight moves to the blank space beneath the project name. Then, follow the procedures in the next section for entering tasks.

Entering Tasks

Follow these procedures to enter the top level of tasks into your project. These tasks can become phases if you add subordinate tasks later:

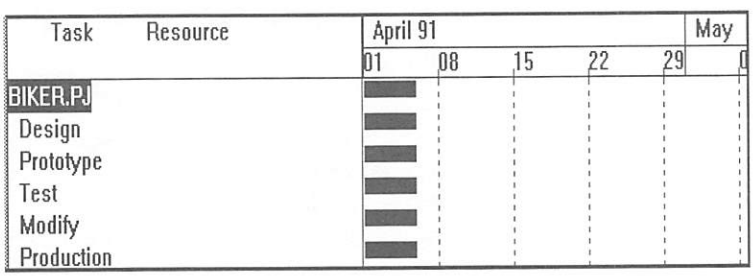
1. Point to the empty space beneath the project name and type the name of the first task or phase, up to 21 characters. You may use upper and lowercase letters and punctuation marks.

   If you are using a mouse, you can click twice to create the task, then rename it.

2. Press **Down Arrow** to move to the next line, ready for entering the next task name.

3. Enter other tasks the same way: point to an empty space in the left column, then type the name.

Continuing with our example, the Task Outline now looks like this:



Creating Project Levels

Follow these steps to add subordinate tasks beneath phases or other headings:

1. Point to the task that will become a heading.

2. Press **F3** to create a task at the same level. This is an alternate way to create a task. Rename the task.

3. If necessary, use **Alt–Shift–Up** and **Down Arrows** to position the new task beneath its heading.

4. While highlighting the new task, press **Alt–Shift–Right Arrow** to "demote" it beneath the heading.

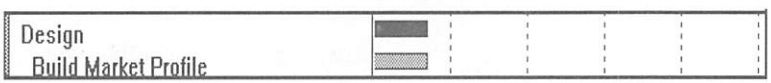
Example: For the sample project, to create task Build Market Profile beneath the heading Design:

1. Highlight the first task, Design.

2. Press **F3** to create another task; name it Build Market Profile.

3. Use **Alt–Shift–Up Arrow** to move the new task beneath Design.

4. Press **Alt–Shift–Right Arrow** or click the **Demote** button on the Tool bar to demote Build Market Profile beneath Design (two levels below the project name):



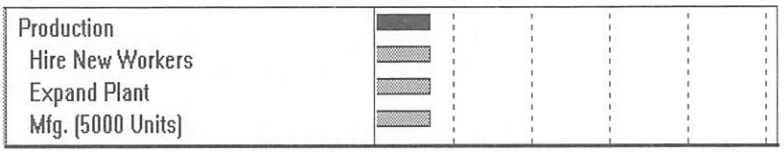
Another Way to Add Levels

You can also add levels by "promoting" tasks:

1. Create tasks at the same level.
2. Use **Alt–Shift–Up** and **Down Arrows** to arrange tasks beneath their headings.
3. Point to the heading and press **Alt–Shift–Left Arrow** to promote it above its subordinate tasks.

Example:

1. Create tasks named Hire New Workers, Expand Plant, and Mfg. (5000 Units) beneath Production.
2. Highlight Production.
3. Press **Alt–Shift–Left Arrow** to promote Production to heading status, and make the new tasks subordinate to it:



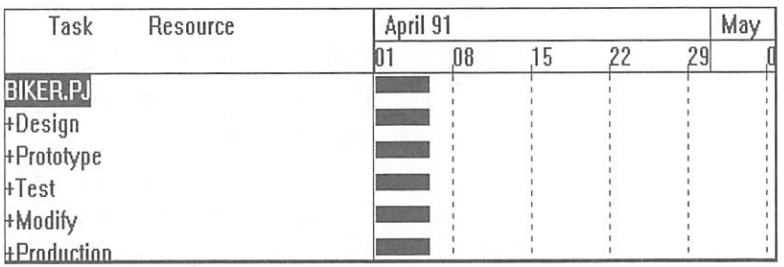
Hiding and Showing Lower Levels

To keep your screens from being cluttered as you build your project, you can "roll up" lower levels into their headings.

To hide or "roll up" lower levels:

1. Place the cursor on a heading, for example Design.
2. Press **Minus** (the - key on the numeric keypad) or click the Hide button on the Tool bar.

On the Task Outline, the + to the left of the heading name means some items are hidden:



To show detail once again, point to the heading and press **Plus** (the + key on the numeric keypad) or click the Show button on the Tool bar.

Procedure Summary

To summarize, on the Task Outline:

- **Alt–Shift–Right Arrow** demotes a task one level.
- **Alt–Shift–Left Arrow** promotes a task one level.
- **Alt–Shift–Up Arrow** moves a task up, above the next task at the same level.
- **Alt–Shift–Down Arrow** moves a task down, below the next task at that level.
- With a heading highlighted, **Minus** on the numeric keypad hides subordinate tasks and assignments beneath their headings. Hidden tasks are indicated by +.
- When you've highlighted a heading or task preceded by +, use **Plus** on the numeric keypad or click the Show button on the Tool bar to show or "unroll" hidden data.

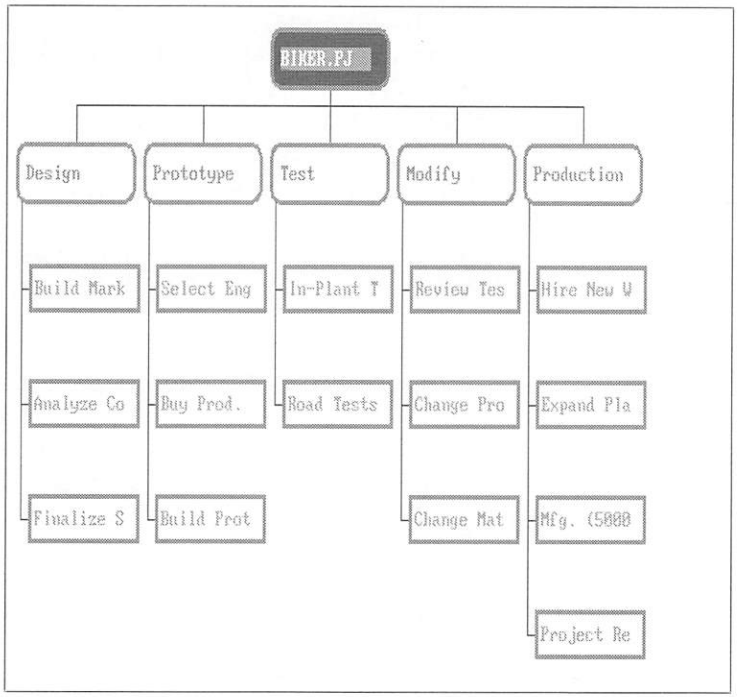
The Task Outline Tool Bar

The following buttons display on the Task Outline View screen. The Tool bar buttons are shown in the illustration below. The table lists the buttons in order from left to right and describes their function.

Button	Function
View Options list box	Selects format options.
Popup Edit Form	Displays a context-sensitive edit form.
Zoom	Shows a task, project, or resource details screen.
All Columns	Displays Gantt columns.
Predecessor/Successor	Lists precessor and successor tasks.
Task Notes	Lets you enter notes and descriptions about a task.
Histogram	Shows histogram or cost/resources chart.
Enlarge Gantt Scale	Enlarges Gantt scale.
Reduce Gantt Scale	Reduces Gantt scale.
Show	Lists rolled up tasks.
Hide	Rolls up tasks.
Demote	Demotes current task under the previous task in project hierarchy.
Promote	Promotes current task to the level on the heading of the current task.
Add Assignments	Assigns a new resource to a task.
CALC	Calculates.

Viewing the Work Breakdown Chart

To get a more graphic view of how promoting and demoting can change your project's structure, select View,Work Breakdown Chart from the menu. This chart shows your project hierarchically, in the form of an organization chart:



You can create tasks, change task levels, and move tasks on this screen.

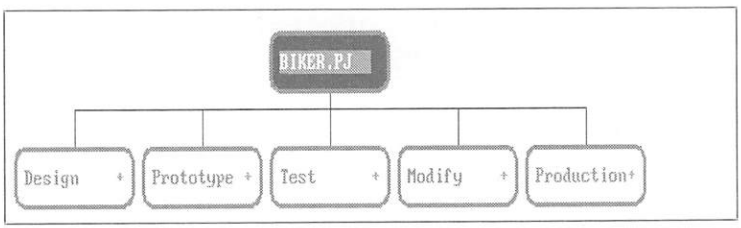
Press **Ctrl-V** or select **Layout,View** from the menu to display different Work Breakdown Chart views: Top Down, Sideways, Top Down Compact (illustrated here), and Sideways Compact. You can also display the different views by clicking the Top Down button, Sideways button, Top Down Compact button, and Sideways Compact button on the Tool bar.

In Top Down and Top Down Compact view, **Alt-Shift-Up Arrow** promotes, **Alt-Shift-Down Arrow** demotes, while **Alt-Shift-Left and Right Arrow** move tasks and headings sideways. In Sideways and Sideways Compact view, you move tasks with **Alt-Shift-Up** and **Down Arrow**; use **Alt-Shift-Right** and **Left Arrow** to promote and demote.

In the default layout, headings are a different shape to distinguish them from tasks. The Design task is a heading, containing tasks Build Market Profile, Analyze Competition, and Finalize Specs. You can load different layouts to change the box size and fit more tasks on screen.

Press **Ctrl-T** to load the next available layout, or select **Layout, Load** from the menu to display a selection list.

Use **Minus (-)** and **Plus (+)** on the numeric keypad to hide subordinate tasks beneath their headings and display them again, just as on the Task Outline. On the Work Breakdown Chart, a small + in the heading box tells you there is more detail than you currently see:



Entering Task Durations

A main consideration in finishing your project is time. How much time do you have? How long does the project take? How long does each task take?

Before you can schedule tasks or the resources that perform them, you must indicate how long each task will take—the Estimated Duration.

There are two types of duration: the Scheduled Duration, which the program calculates as the difference between the Scheduled Start and Finish dates, and the Estimated Duration, which is the duration you enter to indicate your best guess of how long the task will last.

You can enter Estimated Duration on most Views; the Task Outline is convenient. In Beginner mode, you enter the Estimated Duration into the Scheduled Duration field. If your estimate differs from the calculated duration, the calculation displays instead. In the Expert mode, you can see both the Scheduled Duration and the Estimated Duration as two separate columns. You can only enter an Estimated Duration for tasks. CA-SuperProject calculates the durations of headings and assignments based on the task durations.

Procedure: To enter Estimated Duration for a task:

1. Point to the Scheduled Duration field for that task. To easily locate that column, press **Ctrl-C** (shortcut for Edit,Go To Column) and choose Scheduled Duration from the column list.

2. Type in your best estimate of how long the task will take.

Duration entries are understood to be in days, unless you follow the number with **hr** to indicate hours. You may also enter durations in minutes (**mn**), weeks (**wk**), months (**mo**), and years (**yr**).

Heading durations are calculated from the durations of the tasks below them; you may not enter them directly:

Heading/Task	Schd Dur	Task ID	Scheduled Start	Scheduled Finish
NEW_TOY.PJ	13dy	P1	07-09-90 8:00a	07-25-90 5:00p
Design	13dy	001	07-09-90 8:00a	07-25-90 5:00p
Prelim.Spec.	10dy	003	07-09-90 8:00a	07-20-90 5:00p
Meeting	3dy	004	07-23-90 8:00a	07-25-90 5:00p

Entering Must Start/Finish Dates

Some tasks—such as deadlines—are fixed, or tied to specific dates. These fixed dates are called *Must* dates. You can enter them to force a task to occur before, on, or after a given date.

Headings can have *Must Start* dates, and the project itself can have a *Must Start* or *Finish* date, but not both. Must dates can restrict scheduling options, so it is best to limit their use.

Procedure: To enter *Must Start* dates on the Task Outline:

1. Highlight the Scheduled Start field.

2. Type the desired date and press **Enter**. An equals symbol (=) displays beside the date to show that the task must start on that date.

Enter **Must** Finish dates the same way in the Scheduled Finish field. A < symbol displays; the task must finish on or before the date you entered.

In the Beginner mode, you may have either a *Must Start* or *Must Finish* date for a task but not both. If you enter both, the program calculates a Scheduled Duration based on your entries and puts a symbol beside your first entry.

Expert mode offers other Must date options, described in Chapter 4.

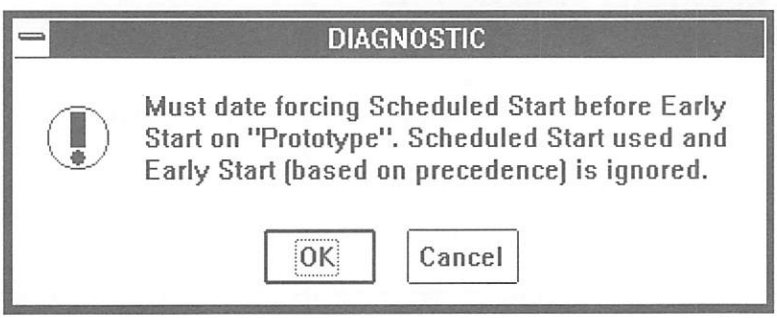
Example: This Task Outline shows Visit Site has a Must Start of 06-07-91; that task must happen on June 7, 1991:

Heading/Task	Task ID	Schd Dur	Scheduled Start	Scheduled Finish	
ELM_HIGH.PJ	P2	812dy	05-15-91>	06-23-94	
Award	015	20dy	05-15-91	06-11-91	
Proposal	001	15dy	05-15-91	06-04-91	
Interview Client	002	5dy	06-05-91	06-11-91	
Visit Site	003	1dy	06-07-91=	06-07-91	

When you create a project, the project Scheduled Start defaults to the current date. Type over the default to change it.

Calculation Diagnostics

Calculation Diagnostics help you identify conflicts between entered and calculated dates. During calculation, messages similar to this one display to point out scheduling problems:


DIAGNOSTIC
Must date forcing Scheduled Start before Early Start on "Prototype". Scheduled Start used and Early Start (based on precedence) is ignored.
OK
Cancel

You can cancel the calculation by pressing **Ctrl-Break** or by clicking the **Cancel** button. Accept the condition by clicking the **OK** button. Cancelling gives you a chance to correct the condition before calculating the schedule. When you cancel calculation, your dates and costs are invalid; resolve the problem, then recalculate by pressing **! (Shift-1)**, **F9**, or the **CALC** button on the Tool bar to make sure your data is correct.

Calculation Diagnostics alert you to these task conditions:

- A task's *Must Start* is earlier than the *Early Start*.

- A task's *Must Start* or *Actual Start* is earlier than the Project Start.

- A task's *Actual Start* or *Finish* is later than the current date.

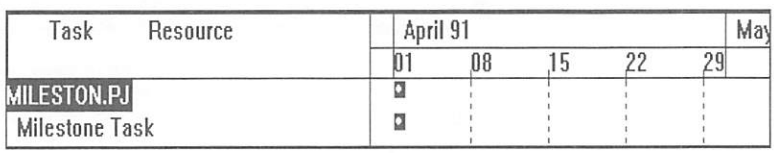
Calculation Diagnostics are helpful in "what-if" analysis; they immediately point out problem areas for each scenario. They are also helpful in determining why a date seems incorrect.

Procedure: If you don't want to see Calculation Diagnostics messages, select **P**references,**C**alculation Options from the menu and make sure *Calculation Diagnostics* is not selected.

See Appendix A for a list of Calculation Diagnostics messages and what to do about them.

Entering Milestones

Milestones are tasks with "0" duration. They serve as markers to indicate that an event is taking place. You might want to mark completion of a phase or maybe a management review—some important project checkpoint. Milestones look different from tasks. Their default symbol on the Task Outline is a square with a circle in the middle:



On PERT and Work Breakdown Charts their default box style is the Ellipse:

Linking Tasks

After you have defined the project's structure, it is time to enter task dependencies. This is done by linking any tasks that must occur in a definite order.

The most common dependency is Finish-to-Start, which indicates one task must *finish* before another task can *start*. This is CA-SuperProject's default link type. If a task must wait on another task only because it needs the same resource, it should not be linked—these assignment schedules are automatically adjusted during schedule calculation, so there is no need for other constraints.

Using the Mouse

Follow these steps to link with the mouse on the Task Outline and PERT Chart:

1. Point to the *predecessor* task (the task being linked to a second *successor* task).

2. Hold down the mouse button and point to the successor task.

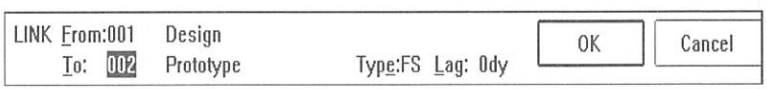
3. Release the button to create a Finish-to-Start link with no lag.

Using Keyboard Commands

You can link tasks on the PERT Chart and the Outlines. The Task Outline is convenient.

Procedure: To link two tasks:

1. Select Edit,Link Tasks from the menu or press **F4**. You'll see a dialog box similar to this:

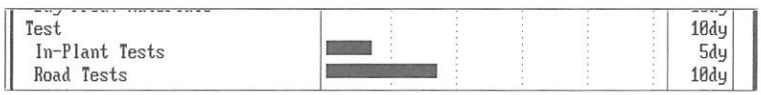


2. CA-SuperProject needs to know which tasks to link together. It asks for the first or predecessor task, then the second successor task. The name of the current task displays in each space. You can:

   - Enter the appropriate Task ID number, or
   - Enter the Task Name, or
   - Use the **Arrow** keys to point to each task, and press **Tab** to accept the name.

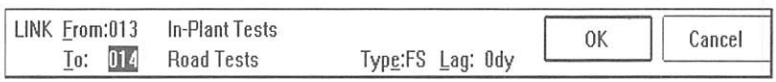
3. Enter the link type and delay lag between tasks, if any. The default link type, FS, means Finish-to-Start and the default Lag is 0, no delay between tasks. Press **Tab** to accept each displayed setting; **Enter** accepts all settings.

Example:

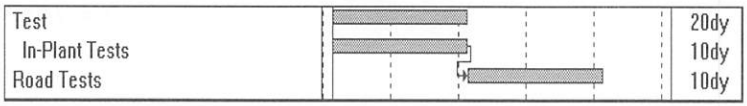


Suppose that Road Tests cannot take place until In-Plant Tests has finished, but then it can start immediately. You can link these tasks to show this dependency.

Press **F4** to display the dialog box. Point to In-Plant Tests, press **Tab**, then point to Road Tests and press **Tab** again:



Press **Enter** or click the OK button to accept all settings. The new Finish-to-Start link shows on the Gantt column, from the end of the first bar to the beginning of the second:



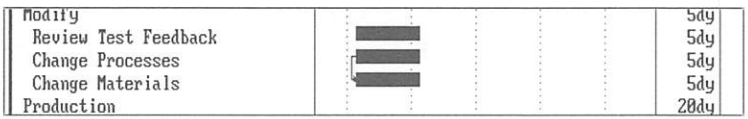
Adjusting Link Types and Task Lag

The default link type, Finish-to-Start, links the successor task's start to the predecessor's finish. This link type satisfies most project needs. But what about situations where two tasks should start or finish together? CA-SuperProject offers two additional link types: Start-to-Start and Finish-to-Finish.

Start-to-Start

Start-to-Start links tie the start of a dependent task to the start of its predecessor. Link tasks Start-to-Start by entering **SS** for the Link Type.

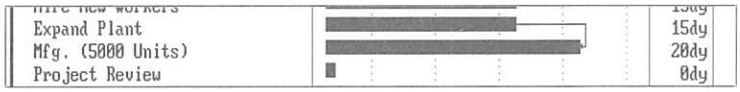
On the Task Outline the link connects the left end (start) of the predecessor task's Gantt bar to the start of the successor (dependent) task:



Finish-to-Finish

Finish-to-Finish links tie a dependent task's finish to the finish of its predecessor. Link tasks Finish-to-Finish by entering **FF** for the Link Type.

On the Task Outline Gantt, this link connects the right end (finish) of both task bars:

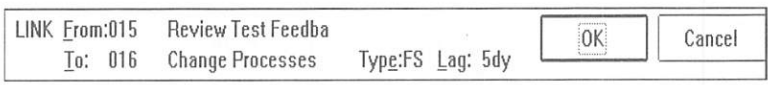


Task Lag

Task lag is a delay between linked tasks the minimum amount of delay reserved between the finish or start of the first task and the finish or start of the linked task. You can have lag on all three link types. For example, if two tasks are linked Start-to-Start, entering a three-day lag forces the successor task to start three days after the predecessor starts.

Use task lag to delay a successor task to wait for the paint or cement to dry, to let the pool drain, to allow time between cold calls and follow-up calls, and so on.

Procedure: To enter task lag when linking tasks, type your entry in the Lag field of the dialog box:



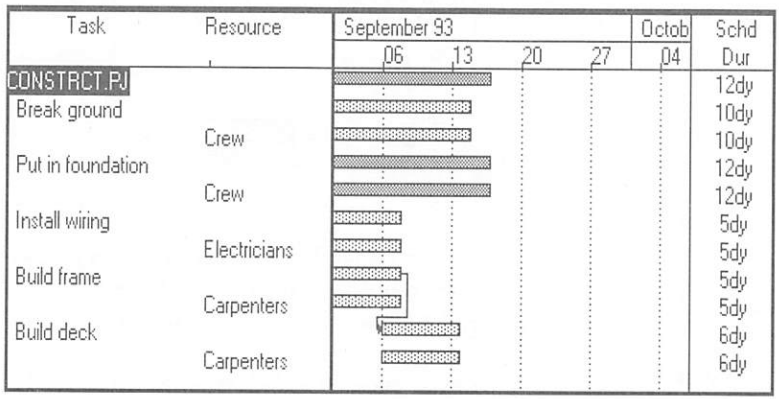
Task lag can be in minutes, days, hours, weeks, months, or years. To specify lag in minutes, type **mo** after the number; for hours, **hr**; weeks, **wk**; months, **mn**; years, **yr**.

You can also enter lag as a percentage of the predecessor's duration.

Example: Suppose Task-7 has a Scheduled Duration of 4 days. If you link it to Task-9 with a Finish-to-Start link and 50% lag, then Task-9 will start 2 days after Task-7 ends.

Lag can be entered as a negative value to allow overlapping tasks. This eliminates the need to use an intermediate task for this purpose. The example below shows various steps in

building a new house. The task *Build frame* is linked to the task *Build deck* and has a negative lag of 2 days.

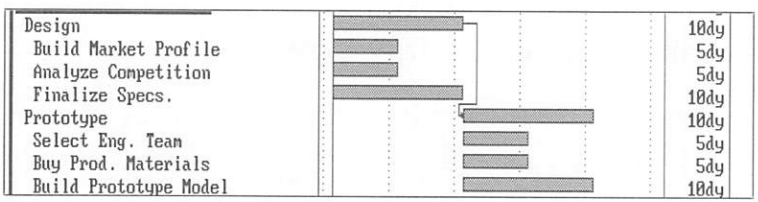


Heading Links

If your project has more than one task level, you can link headings to tasks or other headings. This has the effect of linking each task beneath that heading to the target task or heading.

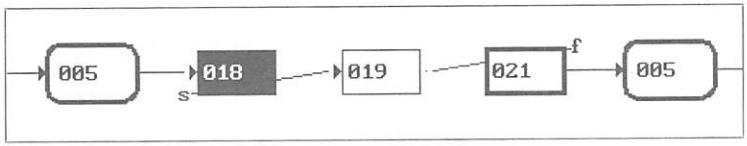
Example: If all of the first phase in our sample project must finish before any of the second phase can start, you can link Design to Prototype to show this.

With a Finish-to-Start link, no task under Prototype can start until all tasks under Design are finished:



Viewing Links on the PERT Chart

On the PERT Chart, Start-to-Start links are marked with an "s"; Finish-to-Finish links have an "f":



If some task boxes overlap others, press **Ctrl–A**, select **Edit,Arrange Chart** from the menu, or click the Arrange button on the Tool bar to uncover them.

Other layouts display different information; some fit more boxes on-screen at once. Press **Ctrl–T** (shortcut for **Layout,To Next Layout**) to cycle through available PERT Chart layouts.

Some Essential Relationships

You have learned how to establish a project structure with headings and tasks, and how to sequence tasks with links and priorities. This section tells more about how headings and tasks relate to each other and the missing ingredient resource assignments. CA-SuperProject's scheduling features are based on their relationships; it is important that you grasp the concepts outlined here.

Headings Summarize Task Data

Heading totals are a summary of task information. Sometimes they are calculated by simple addition of certain task data; otherwise a more complex calculation is used. Similarly, project totals are a summary of heading information. What "information" are we talking about? Scheduling information dates, costs, and scheduled hours.

Think of a heading as a summary of everything below it. In the following example, the Estimated Duration entries for Prelim.Spec. and Meeting feed into their heading, Design:

Task Resource	Schd Dur	Scheduled Start	Scheduled Finish
NEW_TOY.PJ	10dy	03-02-90 8:00a	03-15-90 5:00p
Design	10dy	03-02-90 8:00a	03-15-90 5:00p
Prelim Spec	10dy	03-02-90 8:00a	03-15-90 5:00p
Meeting	3dy	03-02-90 8:00a	03-06-90 5:00p

Here, Design has a 10-day duration, which is the duration of its longest task, Prelim Spec. If these two tasks are linked Finish-to-Start, the Design duration is 13 days (the sum of the two task durations):

Task Resource	Schd Dur	Scheduled Start	Scheduled Finish
NEW_TOY.PJ	13dy	03-02-90 8:00a	03-20-90 5:00p
Design	13dy	03-02-90 8:00a	03-20-90 5:00p
Prelim Spec	10dy	03-02-90 8:00a	03-15-90 5:00p
Meeting	3dy	03-16-90 8:00a	03-20-90 5:00p

As you enter task durations, watch the heading and project durations increase. You will see the immediate impact if *Auto Calculation* is turned on. When you start entering costs, you will see a similar effect.

There's a third dimension to this relationship—assignments.

Assignments—The Basis for All Totals

Assignments are the pairing of a resource with a task. When you assign a resource to a task, you create an assignment.

The task itself has certain conditions—how long it should take, what has to happen first, and so on. An assignment brings additional considerations into play. Is the resource available when the task is scheduled? What about hourly costs? What if the resource is only available a few hours per day?

Assignments actually drive most of CA-SuperProject's scheduling features, and are the basis of all hour, cost, and duration totals.

You'll use these relationships in the next sections as you assign resources and adjust your project schedule for best results.

Assigning Resources to Tasks

One ingredient missing so far is resources—the people to design the product, the equipment necessary to manufacture it, the warehouse required to store the inventory, and so on. As we mentioned earlier, resources can be people, places, equipment, departments, businesses—anything required to complete a project.

There are several Views where you can assign resources to tasks. You can assign one lead resource on the PERT and Work Breakdown Charts, while you can assign lead and additional resources on the Task and Resource Outlines.

Procedure: To assign a resource on the Task Outline:

1. Use the Arrow keys or point with the mouse to reach the task.

2. Press **F6**, or select **Edit,Add Assignments** from the menu, or click the Add Assignment button on the Tool bar. Type a new name for this resource over the default *Rsrc-x* and press **Enter**. When prompted to confirm creating a new resource, respond **Yes**.

3. Type a new resource's name and press **Enter**. If the resource has already been assigned, you can select it from the list. The list is helpful to ensure correct entry of the resource's name; if it is entered two different ways—with or without a middle initial, for example—CA-SuperProject treats it as two different resources.

4. To add a second resource to the same task, highlight the first resource and press **F6** again or click the Add Assignments button on the Tool bar. Type a new name for this resource over the default *Rsrc-x* and press **Enter**. When prompted to confirm creating a new resource, respond **Yes**.

Here is part of the Task Outline with resources added:

Task	Resource	Pri	Alloc /Day	Units Assgn	Sched Rsrc Total Hrs
GRAFSOFT.PJ		50			120.00
Develop schedule					80.00
	Manager	50	100%	1	40.00
	Supervisor	50	100%	1	40.00
Code graphics module					40.00
	Programmer	50	100%	1	40.00

After you have assigned a resource, you can allocate its daily time depending on project needs. "Allocating Resources," later in this chapter, tells how to divide a resource's day among several tasks. Chapter 4 discusses resource types.

Changing Resource Workdays

While building your project, you probably entered company holidays so that no work would be scheduled on those days.

For accuracy, it is important to specify any days a resource is not available—vacation time, sick days, personal days, trips, seminars, doctor appointments, and so on. This tells CA-SuperProject not to schedule work for that resource on those days.

You can also schedule resources to work on days that are normally nonworkdays (such as weekends) by moving to that date block and entering the number of hours on the Resource Calendar.

Entering Resource Nonworkdays

To enter nonworkdays on a resource's individual work schedule:

1. Display the appropriate Resource Calendar; select **View,Calendars** from the menu, then press **Ctrl – N** (for **Select,Next Selected**) or click the Next Resource button on the Tool bar to page through the calendars. Here's part of a Resource Calendar showing March 19th as a vacation day:

Calendar For: Plant Mgr.							
1992	Sun 0.0 0	Mon 8.0 0	Tue 8.0 0	Wed 8.0 0	Thu 8.0 0	Fri 8.0 0	Sat 0.0 0
Mar	01 WKND	02	03 8.0	04 8.0	05 8.0	06 8.0	07 WKND
Mar	08 WKND	09 8.0	10 8.0	11 8.0	12 8.0	13 8.0	14 WKND
Mar	15 WKND	16 8.0	17 8.0	18 8.0	19 Vacation	20 8.0	21 WKND
Mar	22 WKND	23 8.0	24 8.0	25 8.0	26 8.0	27 8.0	28 WKND

2. Select **Edit,Find Date** from the menu, enter the target date, and press **Enter**.
3. Type the reason for the nonworkday (for example, vacation, sick, training) and press **Enter**. Or, save time by pressing **F3**; Holiday displays in the date block. Work is still scheduled for all other resources.

Entering Partial Workdays

You can also indicate how many hours a resource is available on a given day. Here's part of the same Resource Calendar, with 4 entered to indicate he is only available for four hours of work on March 13th:

Calendar For: Plant Mgr.							
1992	Sun 0.0 0	Mon 8.0 0	Tue 8.0 0	Wed 8.0 0	Thu 8.0 0	Fri 8.0 0	Sat 0.0 0
Mar	01 WKND	02	03 8.0	04 8.0	05 8.0	06 8.0	07 WKND
Mar	08 WKND	09 8.0	10 8.0	11 8.0	12 8.0	13 4.0 4.00	14 WKND
Mar	15 WKND	16 8.0	17 8.0	18 8.0	19 Vacation	20 8.0	21 WKND
Mar	22 WKND	23 8.0	24 8.0	25 8.0	26 10.0 10.00	27 8.0	28 WKND
Mar Apr	29 WKND	30 8.0	31 8.0	01 8.0	02 8.0	03 8.0	04 WKND
Apr	05 WKND	06 8.0	07 8.0	08 8.0	09 8.0	10 8.0	11 WKND

You also can enter more hours than the regular workday—just indicate the total hours available in the lower-right corner of a date block. The Resource Calendar above shows 10 hours available for March 26th.

Procedure: To change a resource's available hours:

1. Select **V**iew,**C**alendars from the menu. Then, press **Ctrl–N** or click the Next Resource button on the Tool bar until you reach the target resource.

2. Select **E**dit,**F**ind Date from the menu to move to the correct date.

3. Type the actual number of hours the resource can work that day and press **Enter**.

If CALC displays on-screen, recalculate by pressing **!** (**Shift–1**), **F9**, or the **CALC** button on the Tool bar to update your schedule for the next step. With the next calculation the number of hours CA-SuperProject has scheduled for that day, if any, will adjust so as not to exceed your entry.

Allocating Resources

One of CA-SuperProject's most flexible scheduling features is its ability to take a resource's daily hours—whatever they may be—and distribute them among several different tasks. You control this through assignment allocations, which govern how many hours the resource spends daily on a given task. Then, these assignment allocations drive your project's schedule, determining task start and finish dates.

CA-SuperProject's default Allocation per Day, 100%, means the resource works on the assignment for all available hours—every workday—until all assigned hours have been worked:

Task	Resource	Pri	Alloc /Day	Units Assgn	Sched Rsrc Total Hrs
GRAFSOFT.PJ		50			120.00
Develop schedule					80.00
	Manager	50	100%	1	40.00
	Supervisor	50	100%	1	40.00

CA-SuperProject calculates assigned hours by multiplying the allocation percent 'Task Duration' hours in a Standard Day (usually 8).

If you want a resource to spend less than the full workday on a task, or to work only until meeting a certain number of hours, you need to change the default allocation and/or assigned hours.

Partial-Day Allocations

You can enter a number or percent less than 100% to indicate the maximum hours or percentage of a workday the resource is available for that task every day.

Example: Entering **4hr** means the resource works 4 hours per day on the task. Entering **50%** is the same as 4 for an 8-hour day:

Task	Resource	Pri	Alloc /Day	Units Assgn	Sched Rsrc Total Hrs
GRAFSOFT.PJ		50			100.00
Develop schedule					60.00
	Manager	50	50%	1	20.00
	Supervisor	50	100%	1	40.00

Suppose you want to automatically override the hours scheduled on a Resource Calendar. Use the hours-type Allocation per Day instead of a percentage and type a number greater than the resource's Standard Day.

Unless you have selected *Leveling* on the Calculation Options dialog box, the resource automatically will be scheduled to work on the assignment that many hours per day for the duration of the assignment.

If you're leveling assignments, the program will read available hours from the Resource Calendars. Leveling will remove conflict hours and delay the finish of the task until total hours have been met (using standard workday). "Overriding the Standard Workday" later in this chapter describes how to adjust available hours on the Resource Calendar.

Example: Suppose Sam's Standard Day is "8" and he's assigned to Process Troubleshooting for a week (5 days). If you enter an Allocation per Day of 10hr for that assignment and do not level assignments, he will automatically be scheduled for a 50-hour week for that assignment only.

Partial-Task Allocations

What if you have a task with several assigned resources, but one of them only needs to participate in the beginning, for planning?

With CA-SuperProject, you don't have to schedule the resource for the full task. You can specify how many hours you want spent on that task, and once that's been met, the resource is free for the next task.

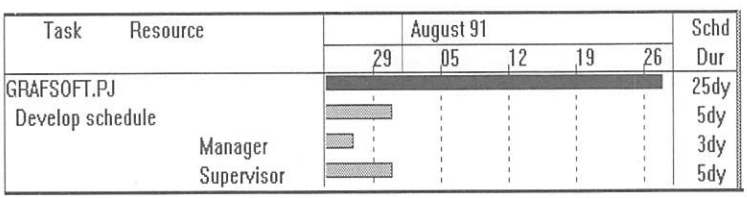
To assign a resource to a task for less than the full task duration, another field comes into play: Scheduled Resource Total Hours. Ordinarily this field is calculated as Task Duration Allocation per Day. For a partial-task allocation, though, you enter the *total number of hours* you want the resource to spend on the task into the Scheduled Resource Hours field.

Example:

Task	Resource	Pri	Alloc /Day	Units Assgn	Sched Rsrc Total Hrs
GRAFSOFT.PJ		50			100.00
Develop schedule					60.00
	Manager	50	100%	1	20.00
	Supervisor	50	100%	1	40.00

Here, the Manager and Supervisor are both assigned to the first task full-tiime—100% of each assigned day. The only difference in their assignments is that the Manager has 20 hours entered in the Scheduled Resource Total Hours field, while the Supervisor has a calculated assignment of 40 hours (5 days, 8 hours per day). On-screen you can tell the Manager's Total Hours have been manually entered. They display in a different color of type.

Since the Manager is only scheduled for 20 hours at 8 hours per day, the assignment is shorter—2.5 days, which displays as 3dy in the Scheduled Duration column. The assignment Gantt bars are different too:



These allocations are powerful; they drive the entire project's schedule. It is important that you understand how these work, because you can overschedule a resource or delay a task by entering an inappropriate allocation.

Example: Suppose you have a three-day task and assign a resource to work two hours per day until 12 hours have been spent. What happens? The task finishes late, because it takes six workdays at two hours per day to add up to twelve. So the three-day task finishes three days late. This is an example of incompatible allocation and duration.

Whenever you have a scheduling problem, you will probably want to start troubleshooting by checking resource allocations. See the next section and "Checking Resource Schedules" later in this chapter for suggestions.

Revising Task Schedules

You have probably noticed that many Views show start and finish dates. The program calculates these dates based on task links, durations, and any Must date entries. Unless Auto Calculation is on, press **!** (**Shift-1**), **F9**, or the **CALC** button on the Tool bar to recalculate. This is the same as selecting **File,Calculate** from the menu.

While first building your project and periodically as your project progresses, you want to check the project finish date—important if you are operating under a deadline.

You also want to verify that task schedules are suitable—that tasks are taking place in order and that all *Must* dates and milestones are met.

Initially, each symbol on the Gantt indicates a day. Use **Ctrl-E** (shortcut for **Layout,Gantt Window Commands,Enlarge Gantt Scale**) or click the Enlarge Gantt Scale button on the Tool bar to expand the chart for easier viewing. Use **Ctrl-R** or click the Reduce Gantt Scale button to reduce it again.

If a date is unacceptable, there are ways to streamline the schedule. But before reducing durations, doubling up resources, or assigning overtime, you must identify the specific tasks where cutbacks will make a difference—the tasks on the critical path.

Critical Path Tasks

The *critical path* is the longest path through the project—if anything on that path either slips or runs late, your project's finish will be delayed. Tasks on other paths may have more than enough time to finish, but on the critical path there is no slack time.

Unless the defaults have been customized, critical path tasks show red on the Gantt; bright on monochrome monitors.

Compressing the Schedule

Now that you have located tasks on the critical path, try one of the following to compress the schedule:

- Can you start the project earlier to finish earlier? Try changing the project start date until you find a date that is early enough to make the project finish on time.

- Can you shorten some of the critical path task durations? If you are only short by a few days, try taking one day of duration away from a few of the longer tasks. Perhaps another resource can help with the missing day's work; see "Adjusting Resource Allocations" later in this chapter for more on changing resource assignments to adjust the schedule.

- If task sequences seem off, delete inappropriate links and enter new ones. Unlinking is similar to linking; select Edit,Unlink Tasks from the menu and enter the target task names or point to them.

- Can you perform some tasks concurrently that are scheduled sequentially? Maybe you can delete some links entirely. If you absolutely must tie a task's finish or start to another, you may be able to use a Start-to-Start or Finish-to-Finish link.

If these Beginner-mode scheduling techniques do not completely solve all problems, try some of the resource scheduling features discussed later in this chapter.

Even if you have successfully solved all your task scheduling challenges, continue with the next section. You may find that some of your people could handle more hours while others are putting in overtime.

Checking Resource Schedules

Each task may require several different resources, with different schedules. They may work different hours, different shifts, or may even have responsibilities in other projects.

You get the most out of your resources' time by optimizing their daily schedules. Then, you have all available resources working at full daily capacity with no "down time" and no work behind schedule.

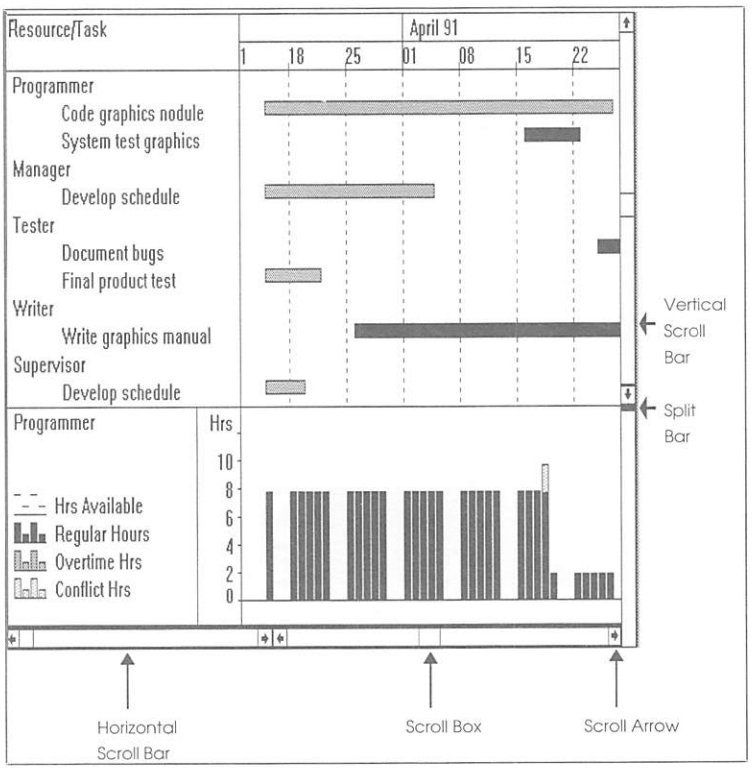
You can turn on CA-SuperProject's leveling features to optimize resource schedules automatically, then turn it off for minor adjustments. Or, there are several ways you can adjust resource schedules without automatic leveling.

CA-SuperProject can schedule resources in a variety of ways. After you are familiar with the standard work pace of one assignment a day for 8 hours a day, you can experiment with half-day and hourly scheduling. You can also specify *how long* you need each resource on the task. For example, you can allocate one resource full-time for the duration of the task, and another resource to work only 2 days on the task, when the task starts. Schedule another resource for a few hours at the very end of the task, for review or testing.

The Resource Outline automatically displays Cost/Resource Charts (in histogram format) to chart each resource's workload over time. This View helps you pinpoint problem areas at a glance, rather than sift through pages of reports or screen details. Viewing Cost/Resource Charts is a good way to check resource schedules, so they are optimized without schedule conflicts.

Viewing Cost/Resource Charts

To view Cost/Resource Charts, display the Resource Outline:



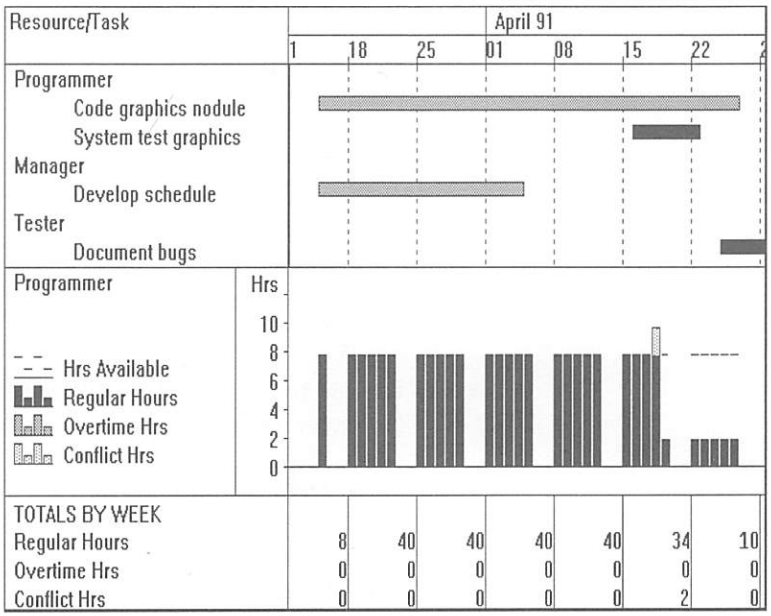
In default format the first column of the Resource Outline shows all resources assigned to the project; each is followed by a list of assigned tasks. To the right is the Resource Gantt, with the Cost/Resource Chart below it. You can use **Ctrl–I** (shortcut

for **Layout,Gantt Window Commands,Increase Cost/Rsrc**) repeatedly to enlarge the Cost/Resource Chart window; **Ctrl-M** reduces it again. You can also enlarge or reduce the Cost/Resource Chart by dragging the Vertical split bar with the mouse.

The Vertical scroll bar and the Horizontal scroll bar let you move to any position on the screen, one line at a time or one window at a time or in a continuous motion. As shown in the illustration, both scroll bars have scroll boxes and scroll arrows which you can drag or click with the mouse.

The default Resource Outline Cost/Resource Chart shows Standard Hours Available and Total Scheduled Hours assigned per day. Total Scheduled Hours are the same as those shown in the upper-right corner of each Resource Calendar date block. For a better view of each resource's hours, select **Layout,Load, Histogram-2** from the menu.

The Cost/Resource Chart displays with data totals below:



A horizontal line cuts across the Cost/Resource Chart to mark standard work hours (Hours Available) for each workday. *Overscheduled* hours (Conflict Hours), if any, display above the line.

Example: In the previous illustration, Programmer has 8 Standard Hours available for April 18, but Total Scheduled Hours are 10. The Cost/ Resource Chart shows the resource is overscheduled 2 hours, or has 2 Conflict Hours.

The next workday shows Standard Hours as 8, but the resource is only scheduled for 2. The Total Scheduled Hours bar doesn't reach the Standard Hours line, which indicates the resource is *underscheduled* and has Hours Available.

This schedule has room for optimization—reducing overscheduled and underscheduled days.

Optimizing Resource Schedules

When a resource is overscheduled, you can:

- Absorb the excess time by scheduling the resource for more hours on that date.
- Assign another available resource.
- Adjust the resource's allocations to accurately reflect task assignments.
- Delay assigned tasks so the workload fits within the resource's capacity (leveling).

You can try the opposite strategy with underscheduled resources:

- Assign additional tasks.
- Check assignment allocations.

The next sections explain these techniques.

Scheduling Excess Hours

One way of resolving a resource conflict is to accept it—that is, have the resource work the additional hours. You can accept the workload by generally increasing the scheduled workday or by increasing available workhours on a particular date

Lengthening the Standard Workday

A drinking glass can only hold a certain volume of water—beyond that, it overflows. Resources are much the same; each has a daily capacity beyond which it is overscheduled. Unlike the drinking glass, which has a fixed capacity, you can define the "capacity" for your resource's workdays—that is, how many hours the resource can "hold."

This capacity is defined in the Workweek fields, found on the Resource Calendar (and on the Resource Details screen in Expert mode). Here, you define the resource's daily capacity for each day of the week:

Calendar For: Plant Mgr.													
1991	Sun	0.0	0	Mon	8.0	0	Tue	8.0	0	Wed	8.0	0	Thu	8.0	0	Fri	8.0	0	Sat	0.0	0

Procedure: On the Resource Calendar, to define the resource's workweek:

1. Move the cursor to the beginning of the Workweek fields. This will be Sunday, if *Calendar Start* on the Date & International Formats dialog box is set to Sunday. Then move right to Monday.

2. Enter the number of hours available for each day of the week. Press **Enter** to move to the next day. You can enter available regular hours to the nearest tenth.

3. Press **Down Arrow** to see more of the calendar portion of the screen.

Overriding the Standard Workday

Suppose Programmer's Allocations per Day are 8hr for *Code graphics module* and 2hr for *System test graphics*. Here, the calendar shows ten hours of work assigned on April 18, which matches the Cost/Resource Chart shown earlier:

Calendar For: Programmer														
1991	Sun	0.0	0	Mon	8.0	0	Tue	8.0	0	Wed	8.0	0	Thu	8.0	0	Fri	8.0	0	Sat	0.0	0
Apr	07	WKND		08	16.0		09	16.0		10	16.0		11	16.0		12	16.0		13	WKND	
Apr	14	WKND		15	8.0		16	8.0		17	8.0		18	10.0 10.00		19	2.0 2.00		20	WKND	
Apr	21	WKND		22	8.0		23	8.0		24	8.0		25	8.0		26	8.0		27	WKND	

The Cost/Resource Chart shows Conflict Hours for April 18, but you can override the Regular Hours entry to eliminate conflict. You're effectively telling CA-SuperProject, "I want the resource to work *x* number of hours that day to finish the task."

Procedure: To override a resource's work capacity (Regular Hours) for a single day:

1. Be sure assignments for that day have only hours-type Allocations per Day, not percentages.

2. On the Resource Calendar, go to the overscheduled date.

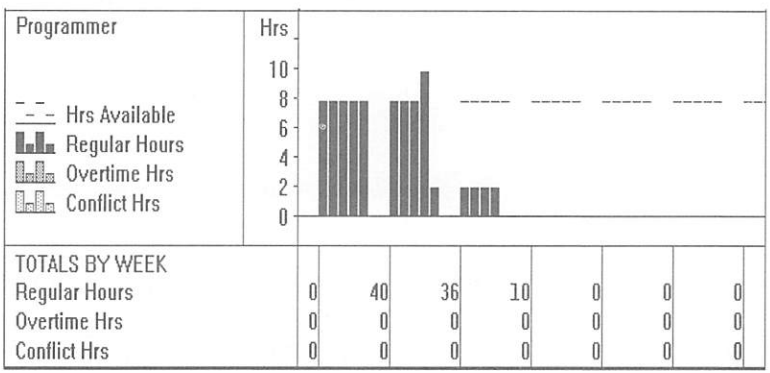
3. Type in the total number of hours you want the resource to work to absorb the extra hours assigned.

The number you enter displays at the bottom of the date block, indicating that this is an override entry. After recalculation, the Cost/Resource Chart for that date no longer shows Conflict

Hours; Hours Available increases to the number you entered on the Calendar.

If the Assignment Scheduled Start and Finish dates move, you may want to adjust the calendar again—the override entries apply only to the dates you specify on the calendar, so if the assignment no longer occurs on those dates, the override entries will not affect it.

Example: In this example, Hours Available for April 18 increases to 10 and the Conflict Hours total for the week is "0":



If you try to adjust a Resource Calendar this way for an assignment with a percentage-type Allocation per Day, CA-SuperProject uses the new entry in its calculations. Conflict Hours remain and resources are scheduled for additional time based on the percent. In the example above, suppose the Programmer is scheduled for 100% on one assignment and 25% on the other (instead of 8hr and 2hr). Then, when you enter **10** to override the Standard Day of "8" CA-SuperProject uses these percentages to allow a workday of 12.5 hours instead of 10 as entered.

Changing the Assigned Resource

Another way to resolve a resource conflict is to assign a different resource; one who is available during that time. If there are other qualified resources who could perform that task,

check their Cost/Resource Charts during the time the tasks take place:

Procedure:

1. On the Resource Outline, select Layout,Load,**Histogram-2** from the menu.

2. Point to resources who might be able to help.

3. Use **Ctrl-B** (shortcut for Layout,Gantt Window Commands,**B**uild Current Chart) to display a chart for that resource.

4. Look for Underscheduled Hours in the total rows below the chart.

5. If another resource is available, try switching resources. You can do this on several different Views.

Example: To change an assigned resource on the Task Outline:

1. Press **Down Arrow** to reach the target assignment.

2. Assign a new resource by typing over the one originally assigned.

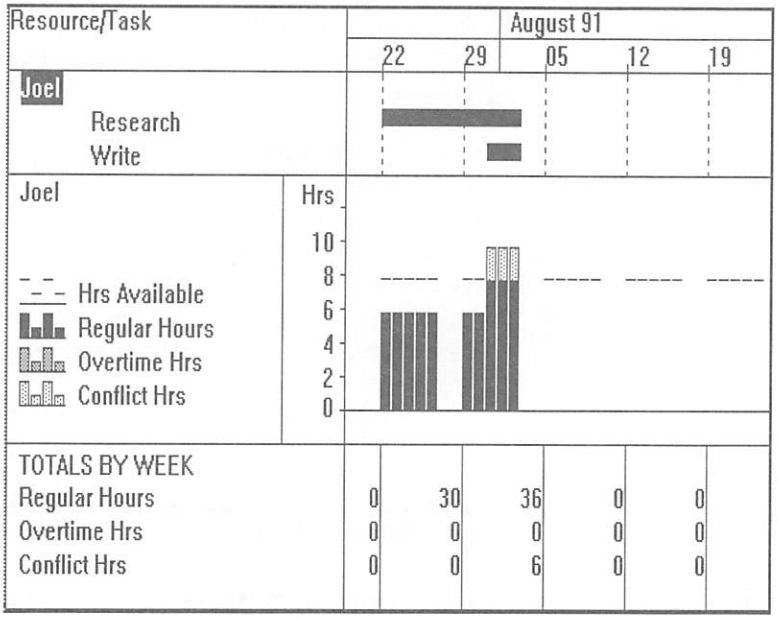
After changing resources, it is a good idea to review each resource's workload on the Cost/Resource Chart. You will catch any conflicts created by a new assignment.

Reviewing Resource Allocations

Often resource allocations can cause overscheduling. You might schedule a programmer for two unlinked tasks and leave the Daily Allocation 8hr for each. If CA-SuperProject schedules both tasks at the same time, the programmer is assigned 16-hour days!

Example: Joel has the standard 8-hour Workweek, meaning he is available eight hours per day, Monday through Friday. Here,

Joel is assigned to Research and Write simultaneously. His Cost/Resource Chart shows Conflict Hours:



The problem is caused by his Daily Allocation on these tasks—six hours per day (6hr) on one, and four hours per day (4hr) on the other. This adds to ten hours scheduled per day, but his Workweek entries say he only has eight hours available per day. He is overscheduled two hours per day (ten scheduled minus eight available) for the three days it takes to complete Write.

To relieve his overscheduling, change the 6hr allocation to 4hr. Now he is only scheduled for 8 hours per day.

The opposite can happen too, where a resource's Daily Allocations add up to less than a standard workday. This would happen to Joel if his allocations were 2hr and 4hr, for a daily total of 6 hours.

Again, setting them both to 4hr, or 2hr and 6hr—or any combination that adds to 8, would solve the problem.

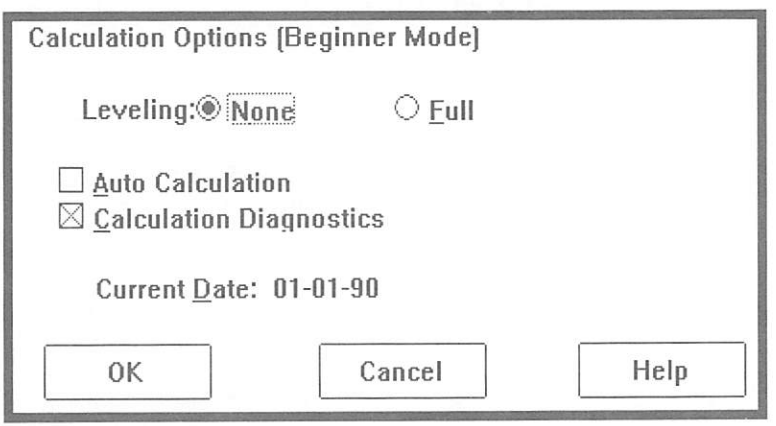
Leveling Resource Conflicts

Resource leveling is a feature designed to even out resource workloads automatically—it reschedules a resource's assignments when the resource has more work than it can handle.

Leveling works by delaying assignments, which in turn may delay their tasks. If you are working under a tight schedule, you may not want to use leveling. Instead, you may want to manually resolve resource conflicts through one of the methods mentioned earlier.

Procedure: If you do want to try leveling:

1. Select Preferences,Calculation Options from the menu to display the Calculation Options dialog box:



2. Point to *Leveling*: Full and press **Spacebar** or click the mouse to select it.

3. Click the OK button to confirm the change.

4. Press **! (Shift-1)**, **F9**, or the CALC button on the Tool bar to calculate the schedule.

The project Scheduled Finish is later, but resources are no longer overscheduled.

You may want to save a copy of your project under a different name *before leveling*. Then you will have an immediate backup copy available if you do not like what leveling did to your schedule.

A Final Review

At this point, you've finished basic project building and scheduling. Take a look at your schedule and see how it looks. Display the Task Outline with Gantt and the Resource Outline with Histogram. Are the project Start and Finish dates acceptable? Are resource assignments acceptable, or are some overloaded and others underscheduled?

If the schedule is acceptable, turn to "Saving the Baseline" and "Communicating the Plan" at the end of Chapter 4 for final planning instructions.

If your schedule still needs work, follow the advanced planning procedures introduced in Chapter 4 to refine the plan.

Now What?—Advanced Planning

This chapter showed you the basic process of building and scheduling projects using the main features offered in the Beginner mode.

We recommend that you use the program for a period of time, and get comfortable with the Beginner features. When you feel you are ready to try more advanced scheduling techniques turn to Chapter 4, where you will learn how and when to use the Expert mode features to continue fine-tuning your project with additional task and resource information, linked projects, subprojects, and costing.

Summary

Here are a few pointers to help you enter basic project information:

- Follow the "Guidelines for Building, Scheduling" eariler in this chapter.

- Use Assist mode for guidance in the beginning; press **Esc** to turn it off later.

- Learn and use the function key commands listed in the *Getting Started Guide*; these are also listed at the bottom of each Beginner mode AnswerScreen.

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Advanced Planning: Refining the Plan

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Chapter 4
Advanced Planning: Refining the Plan

What's in This Chapter?

Chapter 3 introduces the main features of the program—showing how to use the various Views to build, change, and schedule your project. We recommend that you read Chapter 3 before beginning this chapter as it provides a foundation of information on which to build.

In this chapter, you will learn about CA-SuperProject's Expert mode Advanced Planning features—many of which remain hidden in Beginner mode. You will learn more about leveling and additional techniques for optimizing resource time, including how to assign overtime and how to split assignments that are in progress.

Although it is optional, you will also learn how to enter fixed and hourly cost information. Then, as you adjust your schedule, you can see how the changes affect your budget.

We will introduce these concepts and their application: subprojects and linked projects, WBS and Account codes, PERT probabilities and duration deviation.

Finally, we will describe how to format reports and save a baseline plan for progress comparisons.

Guidelines for Advanced Planning

CA-SuperProject's Advanced Planning features help fine-tune your plan so scheduled tasks, resources, and costs are in line with expectations. Many of the steps listed here are optional.

1. Select **Preferences,Expert Mode,Advanced Planning** to access Advanced Planning fields and menu options.
2. Add any additional task information your project needs:
   - Expert mode Must Date entries
   - Task and assignment priorities
   - Task Type and Task Options field edits
   - Task Description and Task Notes
3. Add and change resource information, as needed:
   - Resource type
   - Overtime hours
   - Variable rates, units, and hours entries
   - Material Allocations, if any of your resources are materials and if you have selected *Show Material Fields* on the General Options dialog box
4. Add cost information, if desired, and review the schedule with costs.
5. Make any necessary project refinements to bring scheduled time and costs in line with expectations:
   - Level resource assignments
   - Split assignments
   - Adjust previous task and resource entries
6. Use optional planning features if needed:
   - Linked projects and subprojects
   - WBS and Account codes
   - PERT probabilities and duration deviation
   - User-defined fields

7. Check your plan again, adjust as needed, and when it is satisfactory:
   - Save a baseline version for later comparisons
   - Communicate the plan to others

The rest of this chapter explains each step.

Selecting Advanced Features

Beginner mode offers basic commands and data fields; advanced commands and fields are hidden.

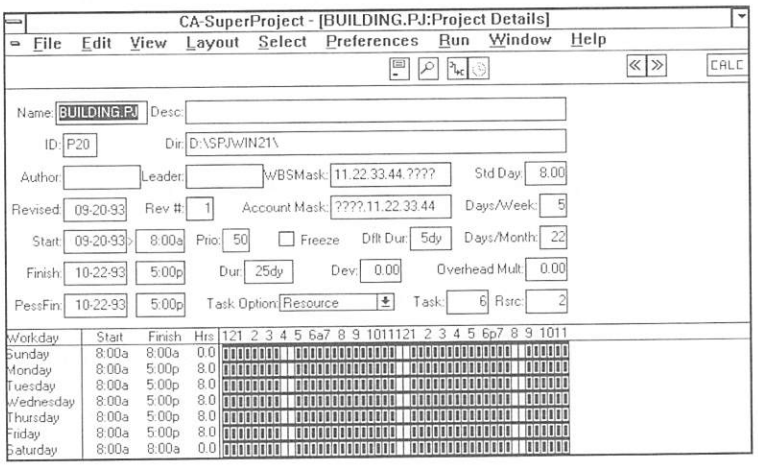
Select **P**references,**E**xpert Mode,**A**dvanced Planning to turn on advanced planning features. Then, you can perform any of the activities introduced in this chapter.

Displaying Details Views

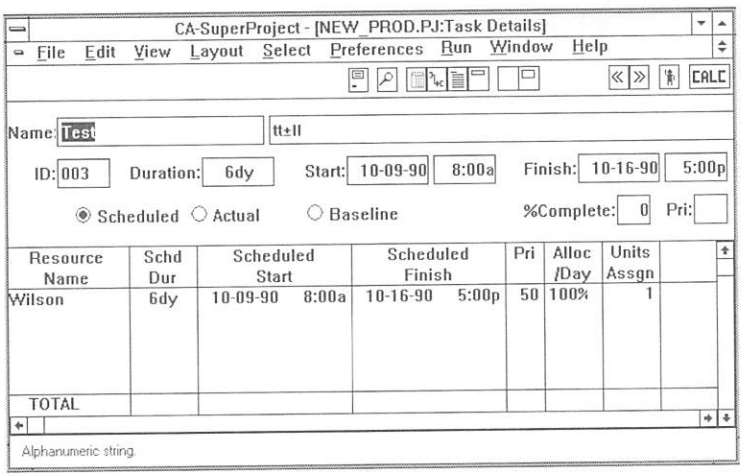
When you enter Expert mode, these additional Views are available: Project Details, Task Details, and Resource Details. Each time you create a new project, task, or resource, CA-SuperProject adds a Details record for it.

These Views, displayed with **View,Zoom into Details**, allow additional project and resource information to be entered:

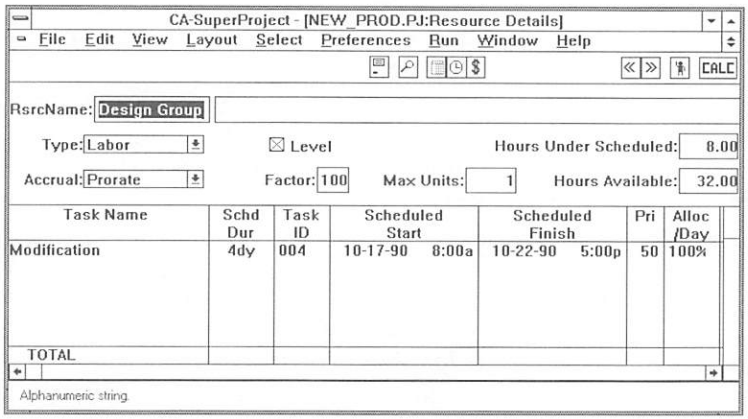
Project Details



Task Details



Resource Details



You can enter data in the top and bottom, except for calculated fields and can print whatever you see on screen with File,Print View (see "Communicating the Plan" later in this chapter).

If you're displaying another View, it is easy to pop up Details for the current name. Just press **Ctrl–Z** (shortcut for View,Zoom in to Details) or click the Zoom button on the Tool bar. Click the Next and Previous buttons on the Tool bar to browse forward and backward through a Details stack.

Adjusting Must Dates

Chapter 3 described how to enter and use *Must* dates in Beginner mode. You learned to enter deadlines and other fixed dates by typing over Scheduled Start or Scheduled Finish entries. If you type over both, the program calculates task duration and displays a symbol (= or <) next to the first date you typed.

Expert mode offers other options for *Must* date entry. You can type them into Scheduled Start and Finish fields as in Beginner mode or enter them directly into Must Start and Must Finish fields. And, you can edit the default Must symbols to tell the program more about your scheduling preferences:

= On

< On or before

> On or after

When you edit a *Must* symbol, the Task Type field changes to match. Or, you can edit the Task Type to change Must symbols. See "Adjusting Task Type and Options" later in this chapter for details. Chapter 7 in the *Reference Guide* provides more information about the Must fields and their contents.

Using Priorities

Priorities work with links to help sequence project activities during leveling. CA-SuperProject lets you rank project activities —and entire projects—by entering priorities from 1 to 999. When two activities are tied for scheduling sequence, CA-SuperProject breaks the tie according to your Priority field entry.

In Beginner mode, 1 is highest priority. In Expert mode, you can change the highest priority to 999 by switching off 1 is *Highest Priority* on the Calculation Options screen.

Priority and Project Levels

Projects and assignments have a default priority of 50; headings and tasks do not display a priority until you enter one. Once entered, heading and task priorities apply to all levels beneath them. Task priorities are entered automatically for all their assignments. Heading priorities display for all "descendants"—their subordinate headings, tasks, and assignments.

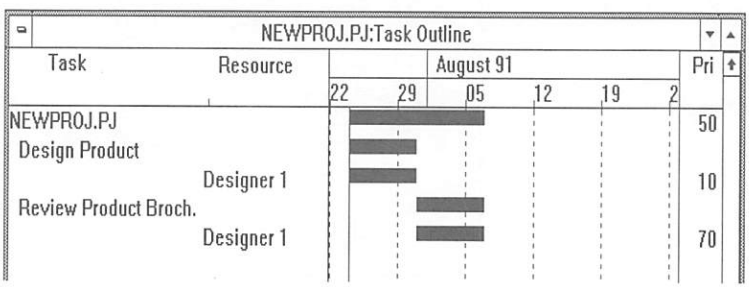
Assignment Priority

Assignment Priority displays on the Outlines and on the Task and Resource Details or Calendars in Assignment view. Its column heading is "Pri."

Originally, each assignment has a priority of 50. To change an Assignment Priority, type over it wherever it displays. Remember, you can select Edit,Go to Column to easily locate the Priority column.

You can enter different priorities for each assignment. This helps when a resource is assigned to several tasks. By entering different priorities for each assignment, you help the program determine assignment order.

Example: The first assignment below has higher priority. If the assignment schedules conflict but other things are equal, CA-SuperProject schedules the higher priority assignment earlier than the others when leveling assignments. The resulting Gantt chart looks like this:



Note: Enter a priority of "0" to indicate that an assignment is not to be leveled. For more information on leveling, see "Leveling Resource Conflicts" later in this chapter.

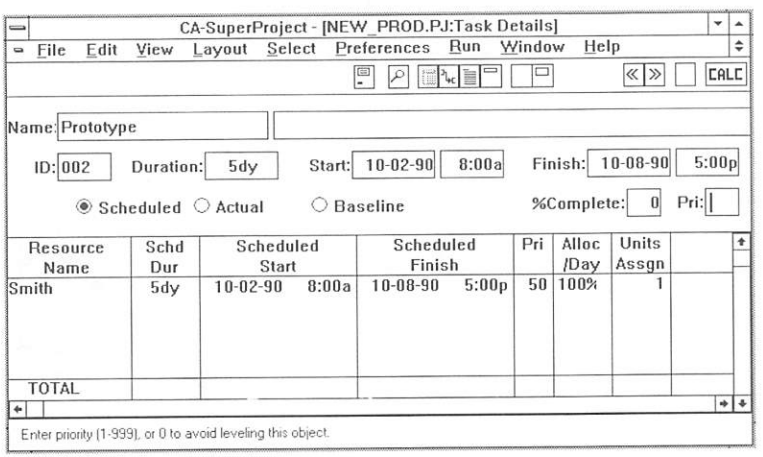
After you have entered different assignment priorities for a resource, you can direct the program to interrupt a low-priority assignment and move to another with a higher priority. "Splitting Assignments" later in this chapter describes the procedure.

Task and Heading Priority

Sometimes it is convenient to set priorities at the task level. Then, all assignments for a certain task have the same priority. If one task is more important than another, no matter what each resource is doing, enter a higher priority for that task and CA-SuperProject will schedule its assignments earlier when possible.

Likewise, if an entire phase has priority over another, enter a higher heading priority. Each assignment for that phase will receive the new priority and be scheduled accordingly.

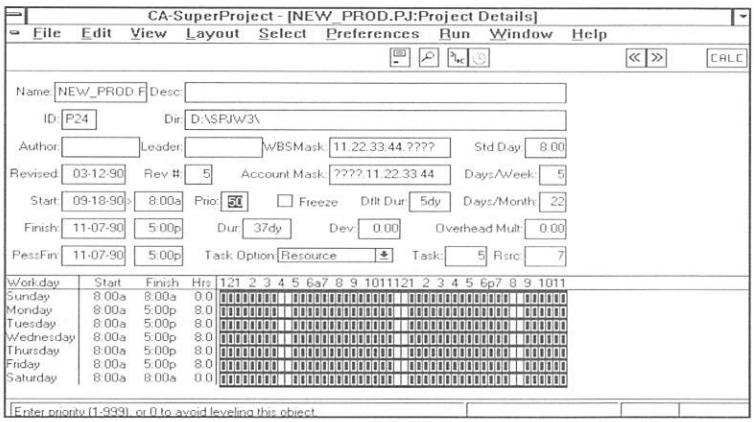
In Beginner mode, you enter priorities on the Task Outline in the column labeled "Pri." In Expert mode, you can also enter task and heading priorities on the Task Details:


CA-SuperProject - [NEW_PROD.PJ:Task Details]
File Edit View Layout Select Preferences Run Window Help
CALC
Name: Prototype
ID: 002 Duration: 5dy Start: 10-02-90 8:00a Finish: 10-08-90 5:00p
Scheduled Actual Baseline %Complete: 0 Pri:
Resource Name
Schd Dur
Scheduled Start
Scheduled Finish
Pri
Alloc /Day
Units Assgn
Smith 5dy 10-02-90 8:00a 10-08-90 5:00p 50 100% 1
TOTAL
Enter priority (1-999), or 0 to avoid leveling this object.

Later sections discuss assignment leveling. You can choose to level on the basis of priority or available slack time (*float*).

Project Priority

Enter Project Priority in an Outline column or on the Project Details:


CA-SuperProject - [NEW_PROD.PJ:Project Details]
File Edit View Layout Select Preferences Run Window Help
CALC
Name: NEW_PROD.P Desc:
ID: P24 Dir: D:\SPJW3\
Author: Leader: WBSMask: 11.22.33.44.???? Std Day: 8.00
Revised: 03-12-90 Rev #: 5 Account Mask: ????.11.22.33.44 Days/Week: 5
Start: 09-18-90 8:00a Prio: 50 Freeze Dflt Dur: 5dy Days/Month: 22
Finish: 11-07-90 5:00p Dur: 37dy Dev: 0.00 Overhead Mult: 0.00
PessFin: 11-07-90 5:00p Task Option: Resource Task: 5 Rsrc: 7
Workday Start Finish Hrs
Sunday 8:00a 8:00a 0.0
Monday 8:00a 5:00p 8.0
Tuesday 8:00a 5:00p 8.0
Wednesday 8:00a 5:00p 8.0
Thursday 8:00a 5:00p 8.0
Friday 8:00a 5:00p 8.0
Saturday 8:00a 8:00a 0.0
Enter priority (1-999), or 0 to avoid leveling this object.

This priority is only for the project as a whole; it is not given to tasks, headings, or assignments. If you are sharing resources across linked projects, the program will schedule one project's assignments earlier than another's— other things being equal— depending on which project has the higher priority. For more about linked projects, see "Linked Projects and Subprojects" later in this chapter.

Adjusting Task Type and Options

By default, CA-SuperProject schedules tasks as soon as possible, and the Estimated Duration is interpreted in project workdays. You can change these defaults by adjusting the Task Type and Task Options fields. This section explains how to choose appropriate settings. For more information, see Chapter 7 of the *Reference Guide*.

Task Type

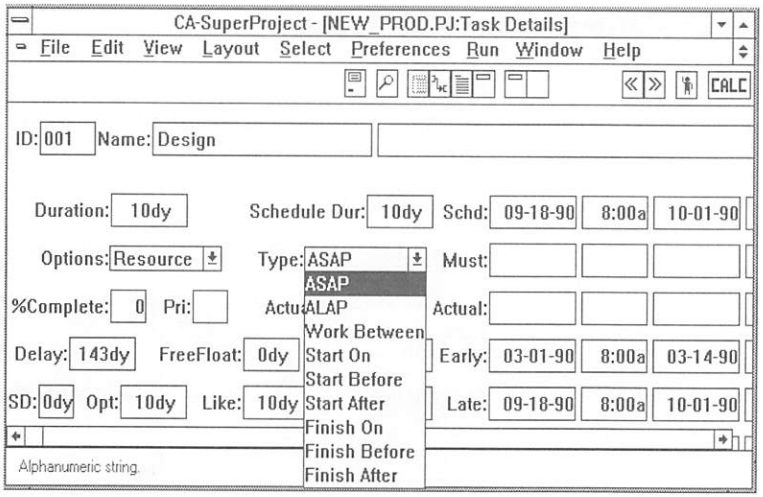
The Task Type field helps determine CA-SuperProject's method of scheduling tasks. Task Type can be ASAP (As Soon As Possible), ALAP (As Late As Possible), or any one of seven modifiers for an entered Must date: Start On, Start Before, Start After, Finish On, Finish Before, Finish After, or Work Between.

The default is ASAP. CA-SuperProject assumes that you want to optimize project time and complete each task as soon as possible. Ordinarily this is the case.

Example: Suppose you are having construction materials delivered COD; you do not want to pay on delivery and have them sitting in storage for two months waiting for site preparation. In this case, you might schedule materials ordering as an ALAP task—as late as possible.

If you have a deadline and need a task to happen before, on, or after a certain date, it is probably a "Must" task and one of the other types applies. The appropriate type is automatically selected whenever you enter a Must symbol (see "Adjusting Must Dates" earlier in this chapter). Or, you can select one of the Start or Finish Task Types; the appropriate Must symbol is automatically set for that task and its current Scheduled Start or Finish becomes a Must date.

Procedure: To change the current Task Type entry, point to the Task Type column on the Outline or the Type field on the Task Details screen:



Press **Ins** or **Alt Down Arrow** to display the options, then use the Arrow keys or mouse to cycle through them. Press **Enter** or click the mouse when your choice is highlighted.

Task Options

When you first enter tasks, you estimate a time length—Estimated Duration—for each task. Then the program calculates Scheduled Duration. The Task Options entry on the Task Outline or Task Details screen helps define Estimated Duration for each task.

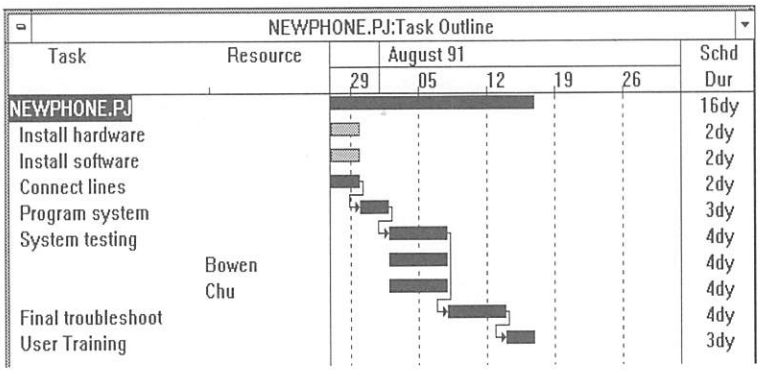
Is Estimated Duration in "resource-hours," straight calendar time, or scheduled work time? Can a task finish when its resources have worked their required time or must the clock or calendar run all the way out? Is there a fixed duration, or is the duration based on the start and finish of linked tasks? You control the answers with your Task Options choice.

CA-SuperProject offers these Task Options: Effort Driven, Elapsed, Workday Driven, Resource Driven (the default), and Span—described in the next sections.

Workday Driven and Resource Driven

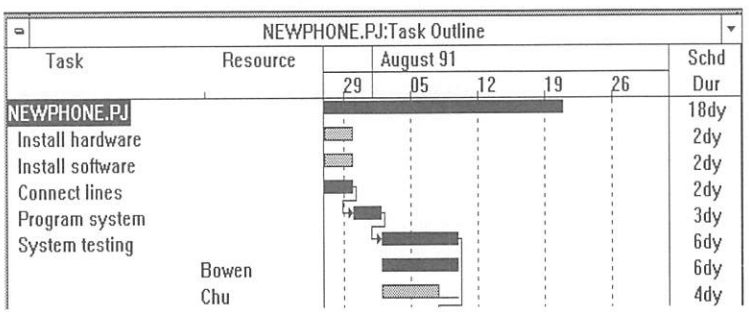
Workday Driven and Resource Driven tasks are similar. Work is scheduled only on project or resource workdays. Each resource can work for part or all of the task's Estimated Duration.

Example: Suppose a Task Outline looks like this:



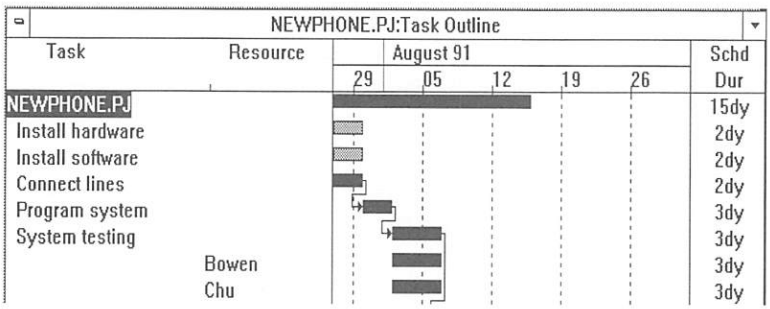
The System testing task is scheduled for 4 days. Bowen and Chu are each assigned to System testing for 32 hours.

Suppose Bowen can only work 6-hour days. At the end of 4 days, he will only have worked 24 hours. If System testing is either Workday Driven or Resource Driven, the task finish will be delayed until he works his 32 hours, partway through the 6th day.



What if Bowen's total hours are dropped to 16 and Chu is willing to work 4 hours overtime each day to pick up the slack?

At this rate, work proceeds faster than scheduled. Both resources work their assigned hours in less than four days. If the task is Resource Driven, it finishes early:



If the task is Workday Driven, it finishes at the end of the fourth day instead of finishing early. That is the only difference between Workday Driven and Resource Driven.

You may want to use Workday Driven when other factors besides resources affect the Scheduled Duration.

Effort Driven

Effort Driven tasks reflect the total effort—"resource-hours"—to accomplish the task, divided among available resources. For example, if it takes one person 5 days to complete an Effort Driven task, then 5 full-time workers can do it in one day. If they can only spend half of each day on that job, it will take them 2.5 days.

When adding resources to a task can reduce its duration, Effort Driven is a good choice. Many labor-intensive jobs (such as clean-up, excavation, framing, roofing) are often classified as Effort Driven. Supervisory and management tasks are rarely Effort Driven.

Other tasks—such as designing, programming, and writing—can be treated as Effort Driven if the work is evenly divided among resources. If the task workload can not be divided evenly, your schedule may be more accurate if you break the task into Resource Driven subtasks before assigning resources.

Elapsed

Some tasks go strictly by the calendar, no matter how many resources work on them. It does not even matter that there is a weekend in the middle. These tasks usually involve a material or process—paint needs to dry, concrete cures, a smelting operation must complete all phases. For these, Elapsed is the best Task Options choice; CA-SuperProject ignores the Project Calendar although it still considers the work schedules of assigned resources. For this reason, it is best not to assign resources to Elapsed tasks. If you must assign them for resource scheduling and costing accuracy, be sure to change their work schedules so they are available on weekends and holidays.

Span

Span durations are as flexible as Elapsed durations are rigid; they stretch and shrink to fit the linked tasks around them. All Free Float and Start Delay are removed; these durations extend from the latest Scheduled Finish of predecessor tasks to the earliest Scheduled Start of successors.

Example: Guarding Premises is a Span task with Delivery of Materials as its predecessor and Arrival of Work Crew as the successor. Guarding Premises starts when Delivery of Materials finishes; it ends when Arrival of Work Crew starts.

Task	Resource	Task ID	Scheduled Start	Scheduled Finish	Task Options
NEWBLDG.PJ		P2	07-24-91›	08-13-91	
Delivery of Materials		001	07-24-91	07-30-91	Resource
Guarding Premises		002	07-31-91	08-06-91	Span
Arrival of Work Crew		003	08-07-91	08-13-91	Resource

What if you need your Span-task resources to work weekends? Just as for any other task, you can alter the Resource Calendar globally or for a limited time to schedule additional hours or days.

Task Descriptions and Notes

If you want to add free-form task information—more than you can fit in the Task Name field—there are two other text fields available.

The Task Description field (which displays on the Task Outline or on the Task Details screen) holds 56 characters. You can enter information, such as an expanded task title, location address—whatever you need to show there. Chapter 7 of the *Reference Guide* describes this field.

If that is not enough, the Task Notes field (on Task Outline or Task Details) holds 5,000 characters. It has its own simple word processor to help you enter and edit information. Chapter 6 of the *Reference Guide* has detailed instructions for entering task notes.

Indicating Resource Type

CA-SuperProject has three resource types: Labor, Other, and Material. The default is Labor. It includes people who work by the hour, on salary, or on a flat-rate contract. Others include computers, earth-moving equipment, temporarily-rented facilities, anything that "works" or is costed by the hour but does not reduce the time on Effort Driven tasks. Material, as the name implies, includes consumable materials— or time. For example, nails are a Material resource. So is consultant time under a "not-to-exceed" contract. Material resources have special allocation codes to indicate how frequently they are used or produced.

Procedure: To change resource type:

1. Select **P**references,**G**eneral Options to display the General Options dialog box.

2. Select *Show Material Fields* to allow selection of the Material resource type.

3. Display the appropriate Resource Details by clicking the Zoom button on the Tool bar or by pressing **Ctrl–Z**.

4. Point to the first field below the Resource Name, which is Type. Then, using the mouse, select the desired resource type.

Example: Suppose you have a task called Sheetrock LR, for hanging gypsum board in a house living room. Its Task Details entries look like this:

Name: Sheetrock LR

ID: 004 Duration: 2dy Start: 07-24-91 8:00a Finish: 07-25-91 5:00p

◉ Scheduled ○ Actual ○ Baseline %Complete: 0 Pri:

Resource Name	Pri	Schd Dur	Scheduled Start	Scheduled Finish	Alloc /Day	Units Assgn
Sheetrock	50	2dy	07-24-91 8:00a	07-25-91 5:00p	100%	1
Jones	50	2dy	07-24-91 8:00a	07-25-91 5:00p	100%	1
Rodriguez	50	2dy	07-24-91 8:00a	07-25-91 5:00p	100%	1

Highlight Sheetrock in the Resource Name column at the bottom of the page and press **Ctrl–Z**. This Resource Details screen displays:

NEWBLDG.PJ:Resource Details

RsrcName: Sheetrock

Type: Labor ☒ Level Hours Under Scheduled: 64.0

Accrual: Prorate Factor: 100 Max Units: 1 Hours Available: 80.0

Task Name	Schd Dur	Task ID	Scheduled Start	Scheduled Finish	Pri	Alloc /Day
Sheetrock LR	2dy	004	07-24-91 8:00a	07-25-91 5:00p	50	100%

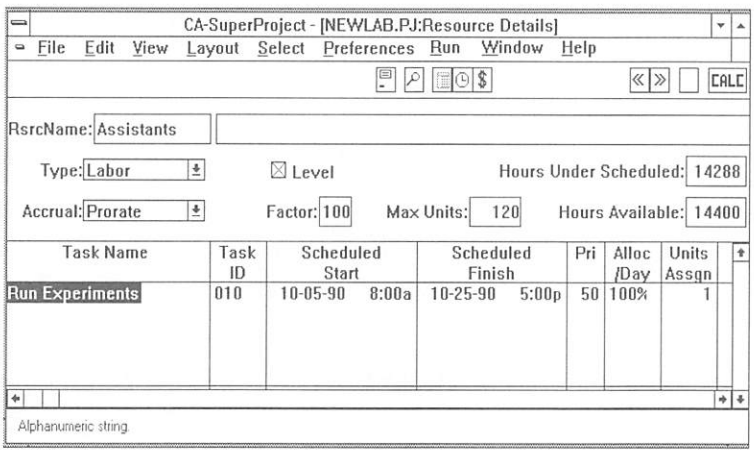
The first field below the name says *Type*. Labor is selected. Select Materials. The resource is identified as Materials. For more information about entering a Materials Allocation showing when you expect to use the sheetrock, see "Introducing Material Allocations" later in this chapter. If you're having more delivered on a regular basis, you can even enter that.

Entering Resource Rates and Units

CA-SuperProject's default resource rate is $25.00 per hour, displayed on the Resource Details just above the Outline fields. This field is the regular rate, with no overtime or overhead costs added on.

The Max Units field appears to the left above the Outline fields. Suppose you enter a department as a resource—Design or Engineering, for example—or a fleet of trucks. You can indicate the maximum number of units in that group resource. Then, you can assign one or more units to each assignment. If you attempt to assign more than the maximum at the same time, CA-SuperProject alerts you.

The Default Units field displays at the right edge of the Resource Details screen. Each time you create an assignment, this number displays in the Assigned Units (Units Assgn) field:



Type over the default in the Units Assigned column to change it, up to the limit of the current Max Units. The number of assigned units affects the Variable Cost value.

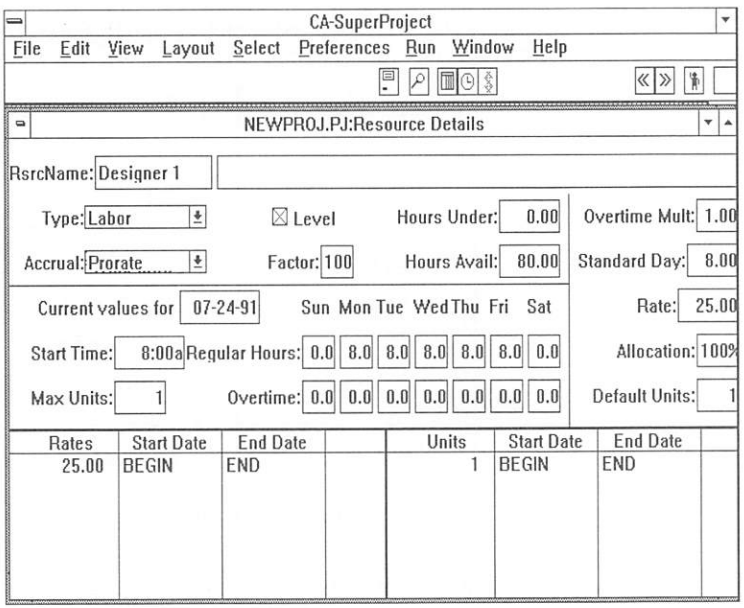
Procedure: To change the Rate and Units entries for a resource:

1. Display its Resource Details.

2. If the resource has more than one unit, enter the number in the Max. Units field.
3. If the base rate *for each unit* is greater or less than $25.00, enter it in the Rate field.
4. Check the Default Units entry to see if it is appropriate for that resource.
5. As you create new assignments, verify that Assigned Units is correct.

Rates and Units for Date Ranges

If units or rates vary over time, you can press **Ctrl–V** (for Layout, View Subwindows) until you reach the Rate/Units view to enter date ranges:



Rates display in the left half of the subwindow; Available Units in the right half. The Start and End Date columns define a date

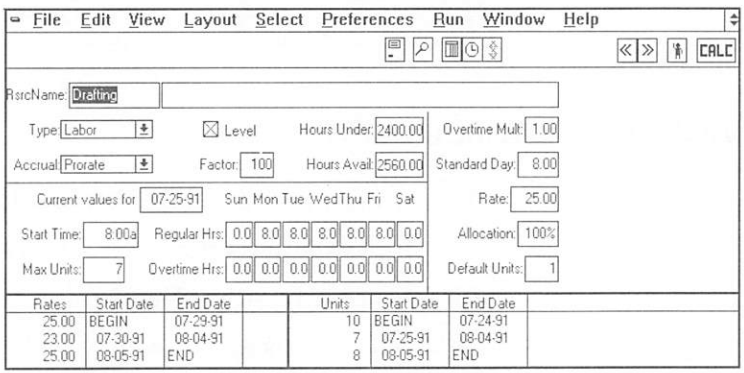
range for each Rates and Units entry. The default range is BEGIN to END, from the beginning of the project to the end.

Procedure: To enter a rate range:

1. Verify the rate in the first column. Type over it if incorrect.
2. Go to the End Date column for Rates and enter the last date at that rate. Second line forms, from the next workday after that date to END.
3. Edit the rate on the second line.
4. Add more ranges the same way, as needed.

Enter Units ranges the same way; you may assign less than the number you have entered during that range, but not more.

Example: These entries for a Drafting group show that more units are needed in early spring, but the average rate drops in the summer months because students are available:



Scheduling Overtime

"Overriding the Standard Workday" in Chapter 3 describes how to assign more hours by overriding a resource's standard workday on the Resource Calendar. You can follow the same procedure in Expert mode—or you can assign Overtime Hours, costed at the regular rate or a premium.

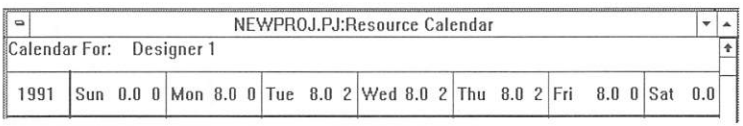
You can schedule overtime on the Resource Calendar or Resource Details screen.

Overtime on Resource Calendars

To schedule overtime on Resource Calendars:

1. Display the appropriate Resource Calendar.
2. Use the **Arrow** keys to select the day blocks at the top of the calendar.
3. Replace the single "0" with a whole number of overtime hours on days when overtime is allowed.

Example: This calendar shows 2 hours overtime allowed on Tuesday, Wednesday, and Thursday every week:

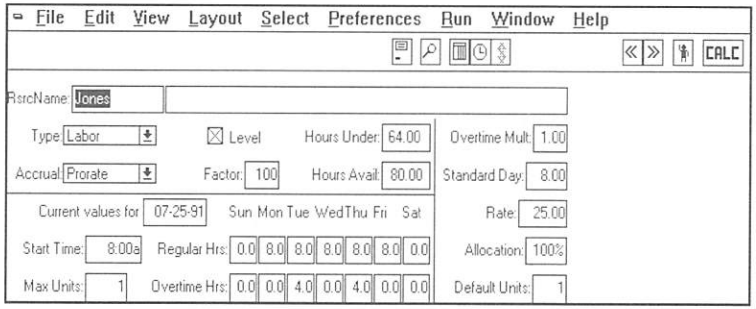


Overtime on Resource Details

To schedule overtime on the Resource Details:

1. Display the appropriate Resource Details.
2. Locate the Overtime Hours row just above the subwindow.
3. Replace the single "0" with a whole number of overtime hours on days when overtime is allowed.

Example: These entries allow 4 hours overtime every Tuesday and Thursday:



Overtime hours are costed according to the Overtime Rate Multiplier, described later in this chapter. You can extend or shorten the regular workday, not counted as overtime, by typing over the entries in the Regular Hours row. You can enter Regular Hours as whole numbers—for example, 8 or 9—or as single-place decimals, such as 7.5.

Overtime for Date Ranges

Sometimes it is convenient to use one work schedule for a limited date range, then switch to another.

Procedure: Click the Work/Periods button on the Tool bar while viewing the Resource Details to display Work Periods view:

Start Hour	Sun RegOvr	Mon RegOvr	Tue RegOvr	Wed RegOvr	Thu RegOvr	Fri RegOvr	Sat RegOvr	Start Date	End Date
8:00a	0.00 0	8.00 0	8.00 4	8.00 0	8.00 4	8.00 0	0.00 0	BEGIN	END

Each day of the week has two columns under it, "Reg" for Regular Hours and "Ovr" for Overtime Hours. To assign two hours overtime for Monday through Friday, move to the Overtime Hours column under Mon and type **2**. Do the same for Tuesday through Friday.

The two columns at the right let you enter a date range. The default range is BEGIN to END, from the beginning of the project to the end. Enter date ranges for overtime the way you enter them in the Rates/ Units subwindow.

Example: Say you only want to assign Rodriguez two hours overtime for one week, from August 1 to August 8. In that case, *before* entering any overtime, go to the End Date column and type the last date without overtime, July 31. A new row is created on the next line, with a Start Date of August 1. Type the overtime hours in that row and enter the last date for two hours overtime, August 8, in the End Date column. A new row is created with August 9 as the Start Date and END as the End Date:

Start Hour	Sun RegOvt	Mon RegOvt	Tue RegOvt	Wed RegOvt	Thu RegOvt	Fri RegOvt	Sat RegOvt	Start Date	End Date
8:00a	0.00 0	8.00 0	8.00 0	8.00 0	8.00 0	8.00 0	0.00 0	BEGIN	07-31-91
8:00a	0.00 0	8.00 2	8.00 2	8.00 2	8.00 2	8.00 2	0.00 0	08-01-91	08-08-91
8:00a	0.00 0	8.00 0	8.00 0	8.00 0	8.00 0	8.00 0	0.00 0	08-09-91	END

If you want, you can assign a different amount of overtime for the next two weeks the same way. You can have different amounts of overtime for each day:

Start Hour	Sun RegOvt	Mon RegOvt	Tue RegOvt	Wed RegOvt	Thu RegOvt	Fri RegOvt	Sat RegOvt	Start Date	End Date
8:00a	0.00 0	8.00 0	8.00 0	8.00 0	8.00 0	8.00 0	0.00 0	BEGIN	07-31-91
8:00a	0.00 0	8.00 2	8.00 2	8.00 2	8.00 2	8.00 2	0.00 0	08-01-91	08-08-91
8:00a	0.00 0	8.00 1	8.00 0	8.00 2	8.00 4	8.00 3	0.00 0	08-09-91	END

In Chapter 3, you learned to change regular work schedules on the Resource Calendar. If you prefer, you can change them here instead. Just edit the numbers in the "Reg" column. No matter how many hours you enter under "Reg," none will be scheduled as overtime nor charged at the overtime rate (see the following section). You can adjust the Start Hour and use date ranges as explained earlier in this section.

Using Overtime

After you have allowed overtime in a resource schedule, you must set the program to actually use overtime when scheduling.

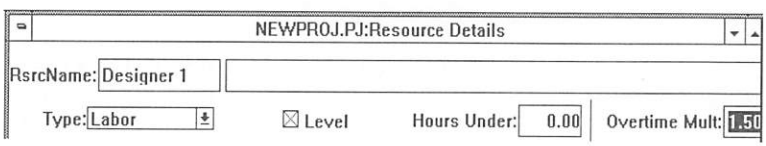
1. Display the Calculation Options dialog box.
2. Set *Use Overtime* to All or Assignments w/Priority Over__.
3. Select All to use all scheduled overtime before displaying Conflict Hours, or choose the ...Priority Over__ option to assign overtime only to high-priority tasks.
4. If you select Assignments w/Priority Over__, enter the priority limit in the space after Over; only tasks with priorities equal to or higher than the limit are assigned overtime.

Now, when you level assignments or manually assign extra hours, each resource's allowable overtime is used before assignments are delayed or resources overscheduled.

Overtime Rate Multiplier

Many charging and billing plans cost overtime hours at a premium rate. You can set CA-SuperProject to do the same.

Procedure: Move the cursor up to *Overtime Mult.* at the right side of the Resource Details and enter your overtime rate. For example, enter **1.5** for time-and-a-half:



Now, when you ask CA-SuperProject to include overtime when leveling and calculating, Jones' overtime will be costed at 1.5 times the regular rate. "Crashing the Schedule" later in this chapter tells more about leveling with and without overtime. See Chapters 6 and 7 of the *Reference Guide* for more about the Resource Details and its fields.

Using Advanced Allocations

"Allocating Resources" in Chapter 3 explains how Allocations Per Day are used with hour and day durations to schedule Labor resources.

This section tells how to schedule Labor resources for minute, week, and month durations. We also introduce scheduling Material resources with Allocations Per Day and Material Allocations.

Allocations with Special Durations

To review, Chapter 3 introduces these Allocation Per Day options:

n hr — The resource spends *n* hours on the task, every day.

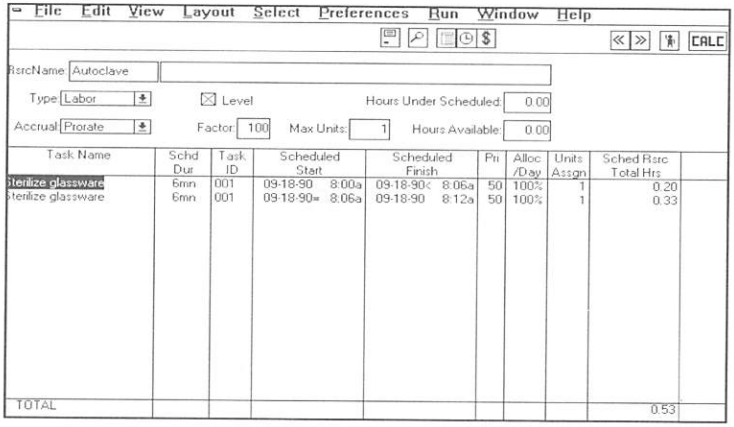
n% — The resource spends *n*% of a workday (from 1% to 100%) on the task, every day. 100% is the default; the resource works on the task for all available work hours.

Assignments in Minutes

It is easy to see how these allocations work with assignments that extend over several days, but what if a task has a duration of 10 minutes, less than one percent of a day?

The key is that the allocations reflect daily maximums for each assignment. If an assignment is shorter than that maximum, CA-SuperProject schedules the resource for the entire assignment and notes that it is available for another.

Example: This Resource Details screen shows a laboratory autoclave scheduled for two 6-minute glassware sterilization assignments:

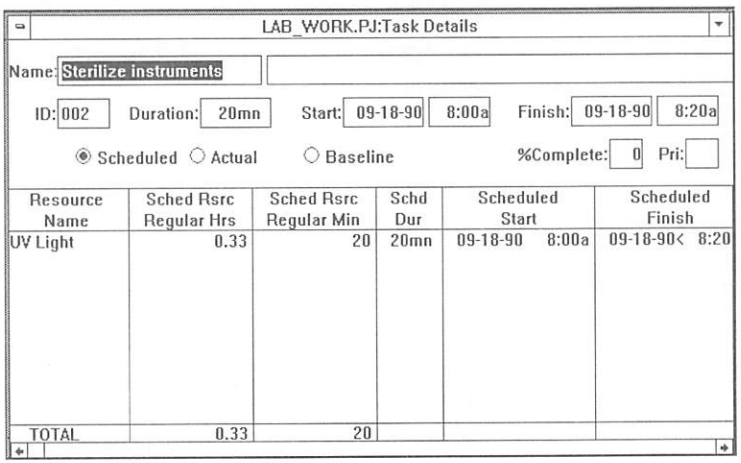


It finishes one and then moves to the other.

Procedure: Sometimes you need to schedule a resource for only a small portion of a longer task, say 20 minutes of a 6-hour task. To do this:

1. At the Task Outline, select **L**ayout,**C**olumn Layout and type a number beside **Sched Rsrc Total Min** (Scheduled Resource Total Minutes) to display that field.
2. Display the Task Details or Resource Details screen in Assignment view.
3. Press **Ctrl–C** (for Edit,Go to Column) and type **Sched Rsrc Total Min**. Press **Enter** when that field is highlighted.
4. Enter the minutes in the assignment's Total Minutes field, then click the CALC button on the Tool bar.

Example: The assignment is scheduled for 20 minutes. Notice that the Total Hours field converts the minutes to the decimal part of an hour, .33 for this example:

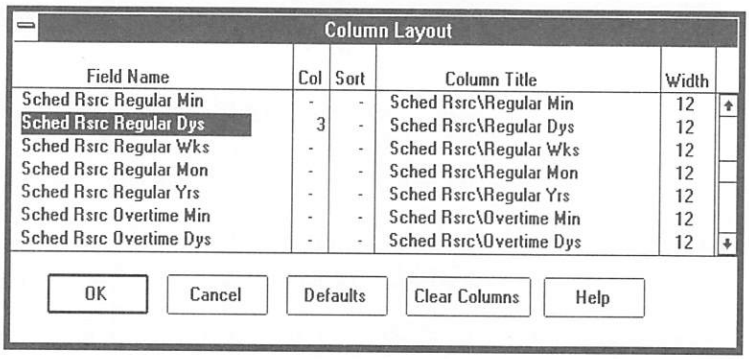


Or, you can move to the Total Hours field and type the decimal; **20** automatically displays in the Total Minutes field.

Assignments in Days

If the duration is in weeks or months and you want to schedule effort in days:

1. At the Task Outline, select **L**ayout,**C**olumn Layout and enter a column number next to **Sched Rsrc Total Dys** (Scheduled Resource Total Days) to display that field:


Column Layout
Field Name
Col
Sort
Column Title
Width
Sched Rsrc Regular Min - - Sched Rsrc\Regular Min 12
Sched Rsrc Regular Dys 3 - Sched Rsrc\Regular Dys 12
Sched Rsrc Regular Wks - - Sched Rsrc\Regular Wks 12
Sched Rsrc Regular Mon - - Sched Rsrc\Regular Mon 12
Sched Rsrc Regular Yrs - - Sched Rsrc\Regular Yrs 12
Sched Rsrc Overtime Min - - Sched Rsrc\Overtime Min 12
Sched Rsrc Overtime Dys - - Sched Rsrc\Overtime Dys 12
OK
Cancel
Defaults
Clear Columns
Help

2. Enter the assignment's duration in the Total Days field on the Resource Details screen:

Task Name	Est. Dur	Sched Rsrc Total Dys	Schd Dur	Scheduled Start	
Writing		40.00	8wk	04-16-90 8:00a	

There are Total Weeks, Months, and Years fields for similar entries.

Introducing Material Allocations

CA-SuperProject's Material Allocation features help you track inventory for consumable materials used in projects. These materials can be parts, raw materials, or even labor purchased under "not-to-exceed" contracts. These features let you indicate:

- How many units are available for use, or are to be produced for all assignments.
- The cost to use each unit.
- How many units to use each hour, each day, or at the start or end of the assignment.
- The number of units to produce each hour, each day, or at the start or end of the assignment.
- The amount of time to spend producing or using materials each day.

- The total time (minutes, hours, days, weeks, months, years) to spend on the assignment.

CA-SuperProject keeps a running inventory of each Material resource based on the rate of production, the rate of use, and the amount of work completed.

Chapter 7 of the *Reference Guide* gives guidelines for entering Material Allocations and checking inventory.

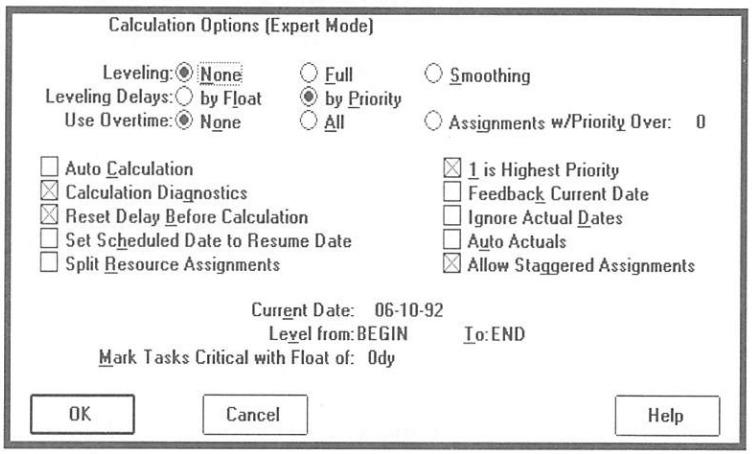
Leveling Resource Conflicts

Resource conflicts occur when resources have more work assigned than they can perform on that day; their assigned workloads exceed the regular hours and any available overtime hours entered on their Resource Calendars and Resource Details screens. You will not see resource conflicts if *Leveling* is set to Full on the Calculation Options dialog box—conflicts are resolved as they occur.

Leveling works by delaying assignments, which in turn may delay tasks. Use leveling when your deadline is fairly flexible; when you are more concerned with resource productivity than the project finish date.

Guidelines for Leveling

You control leveling and other calculation features through settings on the Calculation Options dialog box:



Select Preferences,Calculation Options from the menu to display it. Then, follow these steps to analyze your project and choose appropriate calculation options. All references are to sections later in this chapter:

1. Decide how much leveling you need, if any. The "Full Leveling or Smoothing?" section, later in this chapter, offers guidelines. Select *Leveling*: None for no leveling at all. Select *Smoothing* to set CA-SuperProject for partial leveling, up to the limit of available float. Select *Full* to turn on full leveling.
2. By default, CA-SuperProject levels by priority first, then considers available float. Is this suitable, or are all tasks and assignments of equal priority, so float becomes the main consideration? See "Leveling by Float or Priority" for details.
3. If you have set priorities, which number represents the highest priority task—1 or 999? Select 1 is *Highest Priority* if you want task and assignment priorities interpreted this way. Otherwise, 999 is highest. "Using Priorities," earlier in this chapter, tells more about setting and using priorities.

4. If you have *Leveling* set to None, do you want to remove previous leveling delay before calculating a new schedule? Select *Reset Delay Before Calculation*. "Handling Delay" tells more about this feature.

5. Would you like the program to take resources off lower priority tasks and temporarily assign them to one with higher priority if it helps the schedule? Select *Split Resource Assignments*. See "Splitting Assignments" for an illustration.

6. Is overtime allowed? The setting *Use Overtime:* None schedules only regular hours. To schedule all available overtime, select All. To schedule overtime for all assignments with the same or higher priority than your entry, select Assignments w/Priority Over: __ . See "Leveling With Overtime" for more information.

7. After calculating with *Leveling* set to Full or Smoothing, review the revised schedule and see how leveling helped. If you are experimenting with overtime leveling, you may want to save the project under another name *before* you level.

Full Leveling or Smoothing?

To automatically level your schedule, select Full or Smoothing for *Leveling* on the Calculation Options dialog box, then press ! or **F9** or click the CALC button to calculate the schedule. Both options delay task assignments to reduce daily work schedules for overscheduled resources. The difference is that Smoothing delays only tasks with float, while Full leveling may delay any task with an overscheduled resource.

If your schedule has a lot of float or if a few resources are overscheduled, try Smoothing first and see how your schedule looks. Otherwise, try Full leveling. If you do not like the results, "unlevel" the project. Set *Leveling* to None, select *Reset Delay Before Calculation*, and calculate the schedule.

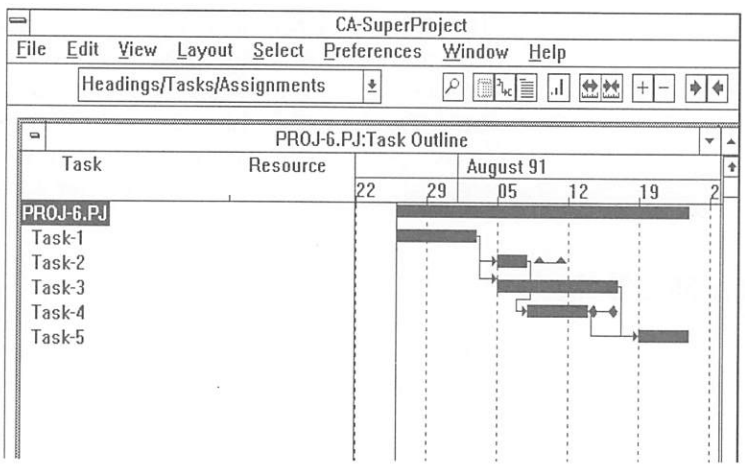
Leveling by Float or Priority

Some tasks may have slack time, or *float*. There are two different kinds of float in CA-SuperProject—Float and Free Float:

- Float is the number of workdays a task can be delayed before it becomes a critical task, where further delay would delay the project finish date or a task with a Must Start On date. Float includes Free Float.
- Free Float is the number of workdays a task can be delayed before delaying the start of any other task but not necessarily the project finish.

Float displays on the Task and Resource Outline Gantt column and in the Float field on the Outlines or Task Details screen. For a quick check, select **Layout, Load layout,GANTT-2.**

Example: This Task Outline/Gantt shows that Task-2 can slip three days before delaying the project finish date, and Task-4 can slip three days before delaying Task-5:



Task-2 has Float, while Task-4 has Free Float. If Task-2 slips three days, it becomes a critical task on the critical path. If Task-4 slips three days, it may delay the start of the successor task, but may not necessarily delay the project finish date. For more about Float and Free Float, see Chapter 7 of the *Reference Guide.*

CA-SuperProject considers several values when leveling. Normally, it considers priority first when delaying assignments —lower-priority assignments are delayed first. Then, it looks for available Float and Free Float. This is the default setting for *Leveling Delays,* By Priority. You have greater control over task sequence—your highest-priority tasks are scheduled first—but checking for schedule delay is secondary.

Sometimes, though, you may not care about priorities. All project activities are equally essential; the most important goal is meeting the scheduled finish. Then, you will want to consider using *Leveling Delays:* By Float. This method can optimize the total schedule in that delaying tasks with more float is less likely to delay the project.

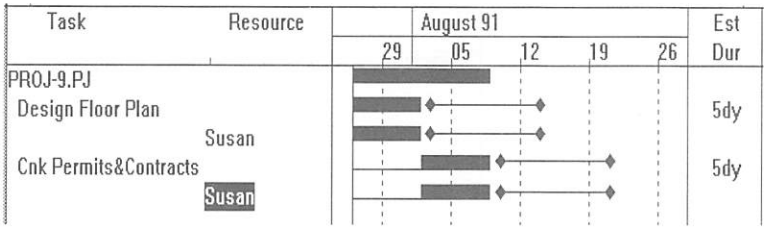
Procedure: Leveling by float is easy—set *Leveling* to either Full or Smoothing, then choose By Float as the *Leveling Delays* option. Each time you recalculate, CA-SuperProject levels any conflicts either fully or partially, with float as a more important consideration than task or assignment priorities.

Leveling by priority may take a little more effort, but it gives you more control over which assignments are delayed. If you are willing to go through each resource's assignments and prioritize them, leveling uses your entries when deciding which assignments to delay and which assignments to leave alone. For details, see "Using Priorities" earlier in this chapter.

Handling Delay

Delay is a waiting period between when a task (or assignment) ***can*** start and when it is ***scheduled*** to start.

How can you tell if a task has been delayed by leveling? Load Task Outline layout GANTT-2 and check the Task Outline Gantt:



If the task shows Start Delay symbols (the default symbol is two triangles connected by a straight line), the task's start may have been delayed by leveling. Another symbol (bar with diagonal stripes) stands for Negative Float/Delay, which might be caused by incompatible Must dates and task links.

Example: The previous illustration, Susan is assigned full-time to Design Floor Plan and Check Permits and Contracts. After leveling, her second task shows Start Delay since it must wait until she is available to start it.

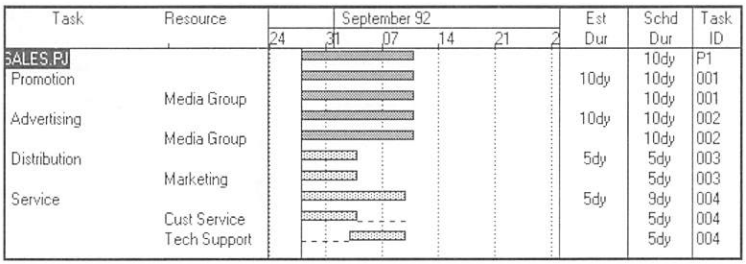
If you do not like the results of leveling, you can return the schedule to its original condition. See "Full Leveling or Smoothing?" earlier in this chapter.

If you do not want an individual assignment or task to have delay, give it a "0" priority so it will not level automatically or enter a Must date so it cannot be delayed, then recalculate with *Leveling* set to Full.

Staggered Assignments

By selecting *Allow Staggered Assignments* on the Calculation Options dialog box, assignments can start at different times within a task. This compresses the project schedule instead of forcing the assignments to start at the same time.

Example: The Task Service is split between two assignments, Tech Support and Cust Service. Tech Support starts five days after Cust Service, instead of being forced to start at the same time.



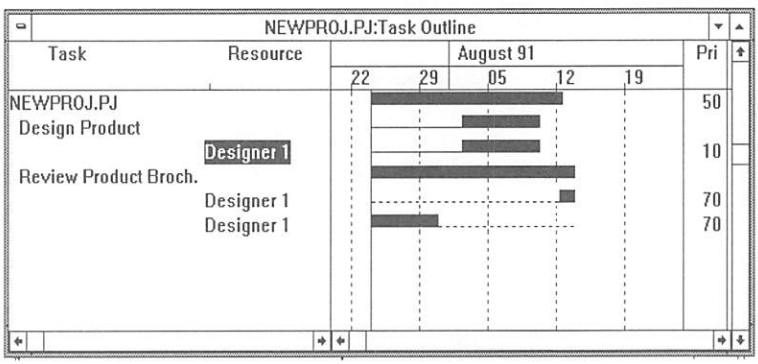
Splitting Assignments

With *Leveling* set to Full, you can automatically interrupt an assignment in progress to shift the resource to a higher-priority task.

Procedure: Select *Split Resource Assignments* on the Calculation Options dialog box. Then, if two tasks require the same resource at the same time, leveling pulls the resource from a lower-priority task if necessary.

The assignment splits at the point of conflict, creating two duplicate assignments on the same task. The last assignment, containing the remaining hours, is delayed until the higher-priority task finishes.

Example: These appear as duplicate assignments on the Resource Outline Gantt chart:



Use this feature for maximum efficiency when leveling assignments by priority.

Crashing the Schedule

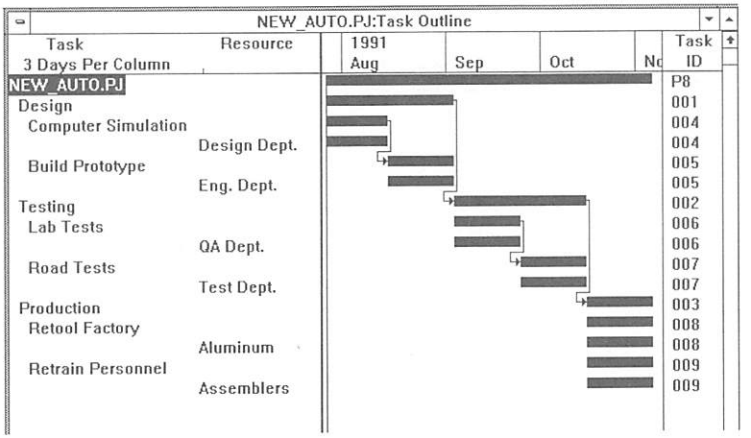
Ideally, your project can proceed with no overtime; it is easier on people and budgets. Sometimes, though, drastic measures are necessary. Funding delays, bad weather, serious illness, late material deliveries—any number of problems can throw a project off-schedule. Or, perhaps there is no way to make your original plan meet a required completion date. CA-SuperProject offers several types of overtime scheduling to help get your project back in gear.

Procedure: *Use Overtime* is the key. This Calculation Options preference offers three choices.

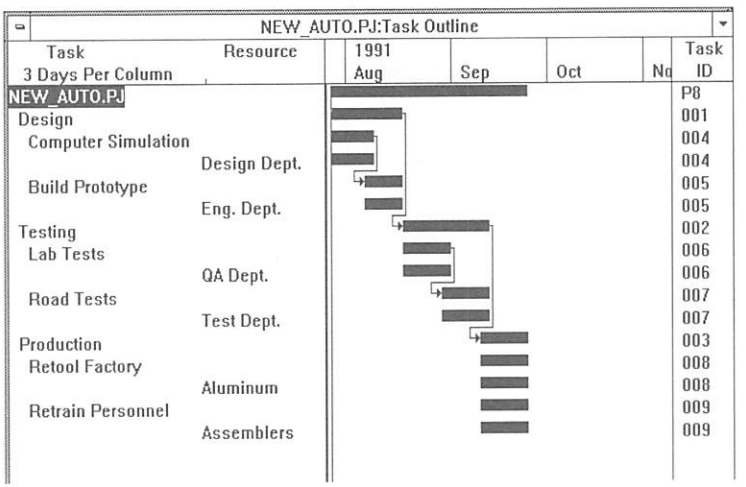
- Select None if you want no overtime scheduled for anyone. Obviously this is the least expensive course, but takes the most time.
- Select All to pull out all the stops. Every resource is scheduled for the maximum overtime allowed on their Resource Details screen.
- Assignments w/Priority Over: __ is a compromise. It allows overtime only on assignments with priorities equal to or higher than the number you have entered.

Example: Suppose each of the resources below is scheduled for a maximum of 4 hours overtime Monday through Friday, plus 8 hours on Saturday. The first screen shows Full leveling without overtime, the second shows *Use Overtime* set to All, and the third shows results with Assignments w/Priority Over: **75**.

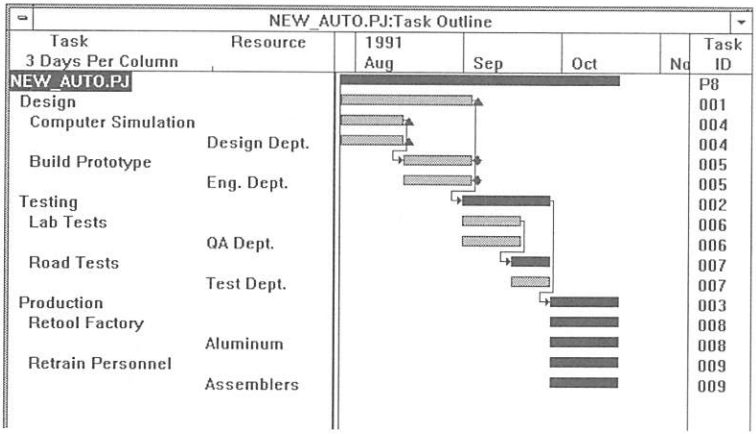
Use Overtime = None



Use Overtime = All



Use Overtime = Assignments w/Priority Over: 75



Selecting All dramatically shortens the schedule, but you pay the price in overtime wages. The next section explains how to set up CA-SuperProject for cost tracking and reporting.

Costing

CA-SuperProject can help you track these project costs:

Flat rate contracts
Outright purchase or rental of facilities and equipment
Labor, including overtime
Hourly contracts
Overhead
Material purchase and production

In Advanced Planning mode, you can track:

- Fixed costs—flat fees and prices
- Variable costs—entered or calculated from hourly and overtime rates
- Overhead costs—a percentage of fixed plus variable costs
- Total costs—variable plus fixed plus overhead costs

Other Expert mode settings let you enter and track actual costs, remaining costs—estimated less actual, and variances based on the total work to be done and the costs to date.

You can also import cost information from CA-SuperCalc, use it in calculations, and export it back. See Chapter 8 of the *Reference Guide* for details on importing and exporting.

You can print several predefined cost reports or prepare your own with exactly the information you need.

The following sections focus on cost activities from a planning perspective. Chapters 7 and 8 discuss monitoring costs as the project progresses, and preparing C/SCSC reports for government contractors and others concerned with Earned Value analysis.

Guidelines for Entering Planned Costs

The Outline screens display costs at every project level:

VIDEOGAM.PJ:Task Outline

Task 3 Days Per Column	Resource	Scheduled Fixed Cost	Scheduled Overhead Cost	Scheduled Total Cost
VIDEOGAM.PJ		0.00	1920.00	21120.00
Story		0.00	540.00	5940.00
Create storyline		0.00	220.00	2420.00
	Product Mgr.	0.00	220.00	2420.00
Hire artists		0.00	0.00	0.00
Buy graphics software		0.00	120.00	1320.00
	Product Mgr.	0.00	120.00	1320.00
Storyboard		0.00	200.00	2200.00
	Artists	0.00	200.00	2200.00
Development		0.00	980.00	10780.00
Develop code		0.00	400.00	4400.00
	Programmers	0.00	400.00	4400.00
Finish final modules		0.00	400.00	4400.00
	Programmers	0.00	400.00	4400.00
Test video game		0.00	180.00	1980.00
	QA Test	0.00	180.00	1980.00
Market		0.00	400.00	4400.00

Costs build from the assignment level. Task costs are the sum of all assignment costs for that task. Heading costs are the sum of all their task costs, and project costs are the sum of all heading costs.

Likewise, resource costs are the sum of all assignment costs for that resource:

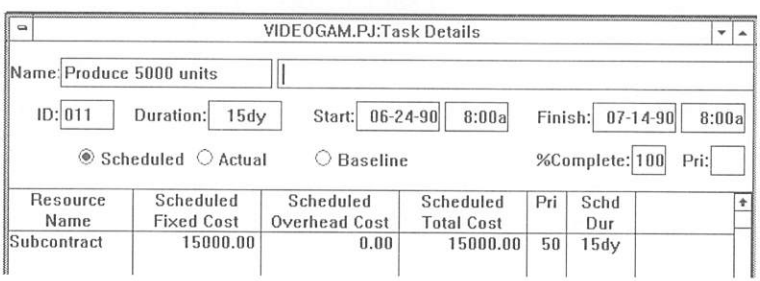
Resource/Task	Sched Rsrc Total Hrs	Rate	Scheduled Variable Cost	Scheduled Fixed Cost
Programmer	214.00	35.00	7490.00	0.00
Code graphics module	200.00	35.00	7000.00	0.00
System test graphics	14.00	35.00	490.00	0.00
Manager	20.00	45.00	900.00	0.00
Develop schedule	20.00	45.00	900.00	0.00
Tester	72.00	18.00	1296.00	0.00

So, where do you start? Here are some guidelines, starting with assignment Variable Costs:

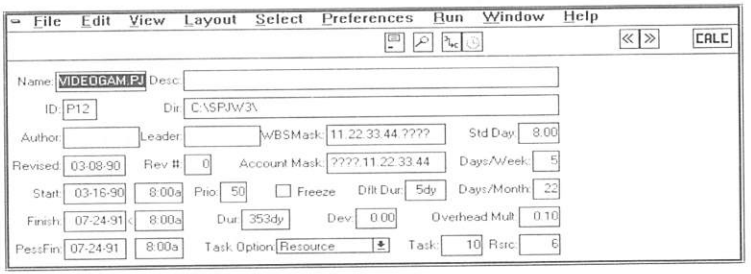
1. Prepare to calculate Variable Costs:

- Check Resource Details for Labor resources to verify that entries for Rate, hourly wages, are correct. See "Entering Resource Rates and Units" earlier in this chapter.
- If there is an overtime rate differential, enter that on the Resource Details. See "Scheduling Overtime" earlier in this chapter.
- For Material resources, fill in the Rate field to indicate the cost of using each unit of inventory. By default, materials with "produce" allocations have a rate of zero, but you can enter a new value.

2. Enter flat fees, total purchase prices, and other fixed costs in the assignment Fixed Cost field. You can do this wherever task/resource assignments display. The Task Details, Assignments view, is convenient:



3. If your project has an Overhead Rate, a percentage of variable costs added on to create a grand total, enter it on the right side of the Project Details screen:


File Edit View Layout Select Preferences Run Window Help
CALC
Name: VIDEOGAM.PJ Desc:
ID: P12 Dir: C:\SPJW3\
Author: Leader: WBSMask: 11.22.33.44.???? Std Day: 8.00
Revised: 03-08-90 Rev #: 0 Account Mask: ????.11.22.33.44 Days/Week: 5
Start: 03-16-90 8:00a Prio: 50 Freeze Dflt Dur: 5dy Days/Month: 22
Finish: 07-24-91 8:00a Dur: 353dy Dev: 0.00 Overhead Mult: 0.10
PessFin: 07-24-91 8:00a Task Option: Resource Task: 10 Rsrc: 6

Wherever you see a Total Cost field—at the assignment, task, heading, or project level—that overhead percentage will have been added in.

Estimating Project Costs

After you have entered variable cost rates and any estimated fixed costs for each assignment, calculate your project and check the results.

Procedure:

1. Display the General Preferences (/Preferences,General Options) and select *Show Cost Fields*.
2. Display the Task Outline screen. Select Layout,Load,**Task Detail-3** to suppress the Gantt chart and display Advanced Planning cost fields:

SOFTWARE.PJ:Task Outline

Task	Resource	Sched Rsrc Total Hrs	Rate	Scheduled Variable Cost
SOFTWARE.PJ		250.00	25.00	6250.00
Develop schedule		40.00	25.00	1000.00
	Manager	40.00	25.00	1000.00
Code graphics module		30.00	25.00	750.00
	Programmer	30.00	25.00	750.00
System test graphics		20.00	25.00	500.00
	Programmer	20.00	25.00	500.00
Document bugs		40.00	25.00	1000.00
	Tester	40.00	25.00	1000.00
Write graphics manual		80.00	25.00	2000.00
	Writer	80.00	25.00	2000.00
Final product test		40.00	25.00	1000.00
	Tester	40.00	25.00	1000.00
Ship software		0.00	0.00	0.00

3. To simplify the Outline and show only tasks, press **Ctrl–V** (for Layout, View Options) until the screen looks the way you want it:

SOFTWARE.PJ:Task Outline

Heading/Task	Sched Rsrc Total Hrs	Rate	Scheduled Variable Cost
SOFTWARE.PJ	250.00	25.00	6250.00
+Develop schedule	40.00	25.00	1000.00
+Code graphics module	30.00	25.00	750.00
+System test graphics	20.00	25.00	500.00
+Document bugs	40.00	25.00	1000.00
+Write graphics manual	80.00	25.00	2000.00
+Final product test	40.00	25.00	1000.00
Ship software	0.00	0.00	0.00

4. In default form, heading totals show in a row beside the heading—"rolled up." If you prefer, you can display totals in a subtotal row beneath the tasks:

SOFTWARE.PJ:Task Outline

Task	Resource	Sched Rsrc Total Hrs	Rate	Scheduled Variable Cost
SOFTWARE.PJ			25.00	
Develop schedule			25.00	
	Manager	40.00	25.00	1000.00
Code graphics module			25.00	
	Programmer	30.00	25.00	750.00
System test graphics			25.00	
	Programmer	20.00	25.00	500.00
Document bugs			25.00	
	Tester	40.00	25.00	1000.00
Write graphics manual			25.00	
	Writer	80.00	25.00	2000.00
Final product test			25.00	
	Tester	40.00	25.00	1000.00
Ship software		0.00	0.00	0.00
TOTAL		250.00		$ 6250.00

To do this, display the Layout,Outline Layout screen, move the cursor to the Totals row, and select one of the *Subtotal...* options instead of Rollup; *Subtotal Lowest Level* is a useful basic choice. Press **Enter** to display the Outline screen with subtotals.

Remember, too, that you can place the cursor on a heading and press **Minus** (on the numeric keypad) to hide all subordinate tasks. Press **Plus** to display them again. You can also click the Hide button on the Tool bar to hide all subordinate tasks and click the Show button to display them again.

Hopefully, your costs are in line with what you expected. If not, see where you can make cuts. "Final Check" later in this chapter suggests some cost-cutting tactics you might try.

Preparing Cost Reports

When a layout looks the way you want, you can print it with File,Print View. "Communicating the Plan," later in this chapter, contains more information on formatting layouts and printing them.

Other Advanced Planning Features

The features described earlier in this chapter suit the needs of most project managers. For those with many tasks and resources who require maximum power, CA-SuperProject offers these additional features:

- Linked projects and subprojects.
- WBS and Account codes.
- PERT probability and task deviation measures.

Use any that can help with your project, then you will be ready for the last planning steps before the project starts.

Linked Projects and Subprojects

There are three ways a project can interact with related projects:

- As linked projects, used primarily for scheduling resources working on multiple projects. This way, you can easily see and manage each resource's workload, including assignments in all projects.
- As subprojects, where a task in a larger project represents an entire project. Using subprojects lets you break your project into pieces when a single large project does not fit into memory.
- By creating task dependencies between projects.

By linking projects, you are telling CA-SuperProject that you have many projects underway that share the same resources.

By creating a subproject, you are creating a stand-alone project that is part of this project's schedule, to save memory or to distribute to another manager for updating. Linked projects are better for managing resources common to several projects—projects or subprojects must be linked before shared resources can be scheduled across more than one project.

Chapter 7 of the *Reference Guide* gives detailed information on linked projects, subprojects, inter-project dependencies and their use.

WBS and Account Codes

Work Breakdown Structures are organizational systems that break project activities into levels according to a predefined project hierarchy. Each level and task of the hierarchy is indicated by a code. Account Codes are somewhat similar. CA-SuperProject provides fields for both. These two features are both available in Beginner mode.

These codes can be simple or complex, depending on your needs. In CA-SuperProject, you can enter each task's WBS or Account Code manually, or have CA-SuperProject automatically calculate it for you from a "mask" or template defined on the Project Details screen. Chapters 6 and 7 of the *Reference Guide* provide more information about these masks and how to customize them.

If you're a government contractor working to C/SCSC (C-Spec) criteria, you can use the WBS and Account Codes to generate required progress reports. "Interpreting and Reporting Data" in Chapter 6 has suggestions.

WBS Codes

A commonly-used Work Breakdown Structure is by phase, where the various phases a job goes through are indicated by the first digits, and the individual tasks within those phases are the next level digits, and so on.

BIKER.PJ:Task Outline

Task	Resource	Work Breakdown Code	Est Dur	Schd Dur	Scheduled Start
BIKER.PJ		01.00.00.00.0000		65dy	12-03-90>
Design		01.01.00.00.0000		10dy	12-03-90
Build Market Profile		01.01.01.00.0006	5dy	5dy	12-03-90
	Mkting Dept.			5dy	12-03-90
Analyze Competition		01.01.02.00.0007	5dy	5dy	12-03-90
	Mkting Dept.			5dy	12-03-90
Finalize Specs.		01.01.03.00.0008	10dy	10dy	12-03-90
	Design Group			10dy	12-03-90
Prototype		01.02.00.00.0000		10dy	12-17-90
Select Eng. Team		01.02.01.00.0009	5dy	5dy	12-17-90
	Eng. Group			5dy	12-17-90

Account Codes

Some companies organize their work by department, so each department is indicated by a certain prefix:

Design	*Marketing*	*Production*	*Administration*
01	*02*	*03*	*04*

Cost categories within a department are indicated by numbers following the prefix:

02 Marketing
02–01 Travel
02–02 Supplies
02–03 Advertising

Example: Here is a sample Account Outline defined with the default Account Mask:

BIGBIKE.PJ:Account Outline

Account	Task	Resource	Schd Dur	Task ID	Scheduled Start	
0000.01.00.00.00		Marketing				
0000.01.01.00.00		Design				
	Build Market Profile	Mkting Dept.	5dy	006	07-29-91	8:00a
	Analyze Competition	Mkting Dept.	5dy	007	07-29-91	8:00a
0000.01.02.00.00		Sales				
0000.01.03.00.00		Prod/Mfg.				
0000.01.04.00.00		Other				
0000.01.05.00.00		Development				
	Finalize Specs.	Design Group	10dy	008	07-29-91	8:00a
0000.02.00.00.00		Development				
0000.02.01.00.00		Design				
	Select Eng. Team	Eng. Group	5dy	009	08-12-91	8:00a
	Buy Prod. Materials	Prod. Mater.	5dy	010	08-12-91	8:00a
	Build Prototype Model	Eng. Group	10dy	011	08-12-91	8:00a
0000.02.02.00.00		Sales				
0000.02.03.00.00		Development				
	Review Test Feedback	Eng. Group	5dy	015	09-23-91	8:00a

"Account Outline" in Chapter 6 provides more information about Account Codes and how they are used for tracking and reporting.

PERT Probability

Project duration is calculated from task durations and dependencies. PERT Probability lets you build a degree of uncertainty into task durations, which subsequently affects the project duration. This "confidence factor" defines a reasonable window of time within which a task should finish.

CA-SuperProject lets you estimate a range of task durations, from either an entered deviation factor or "best case/worst case" duration entries.

Task Duration Deviation leaves a margin of error in the task's duration. When you enter a deviation, CA-SuperProject calculates the optimistic, likely, and pessimistic durations from your entry.

Optimistic, Likely, and Pessimistic Durations are estimates of the shortest and longest conceivable task durations, from which a likely, or probable, duration is calculated. When you enter these durations, CA-SuperProject calculates the Duration Deviation from your entries.

Chapter 7 of the *Reference Guide* provides more information about these fields and how to interpret and use them.

Final Check

With all your data entered, it is time for a final check. If that looks good you can save the project baseline for future comparisons and communicate the plan to upper management and key players.

Procedure: Calculate the schedule with **!** or **F9** or the CALC button. Then, display the Task Outline with Gantt to check dates and costs. Load layout **Compare Dates** to display key Starts and Finishes; load Layout **Compare Costs** to focus on costs.

Chances are good that you are either beyond your deadline or over-budget—or both! It is time to get creative.

Does the plan take too long? Only you can determine the best way to compress the time, based on your company's priorities. You can try shortening the duration of the longer tasks, adding contract workers, authorizing overtime, pulling employees from other departments, and reevaluating task dependencies.

Is the plan too expensive? Can you use more inexpensive materials? Can you hire contract labor at a lower wage? Can you shift more of the workload to salaried employees who do not accumulate overtime? What about accepting additional bids on outside work?

This phase, "trimming the fat," will be a gradual paring of time and costs until the project fits within your limits. You will try rearranging tasks, reassigning resources, and finally come up with a plan that stands a good chance of working.

Then, you are ready for the next step—to save your plan as a baseline for future progress checks.

Saving the Baseline

Wouldn't it be helpful to compare your original estimates with the final results? As a project manager, there may be times when you want to evaluate how realistic your plans were.

CA-SuperProject lets you preserve your original schedule, including task Scheduled Start/Finish dates and estimated costs. This original version of your project is called the project baseline.

After you have created this baseline, the baseline dates and costs display on-screen, and you can sort/select tasks by baseline dates or costs. When your project has finished, for example, you can print a report showing each task's baseline dates next to its actual dates, to help identify where plans went astray.

What other CA-SuperProject features can you use with the baseline? In Expert mode, the Earned Value fields use your baseline entries. You can also compare your original planned schedule with the actual schedule on the Gantt chart through settings on the Bar Symbols dialog box (see Chapter 5 for details).

Procedure: To save the baseline, select **P**references,Expert Mode,**B**aseline Compare. This displays the Baseline fields, listed in Chapter 7 of the *Reference Guide*.

While you can manually enter a planned or estimated value into each of these fields, CA-SuperProject has an easier way. Display the Task Outline and select **E**dit,Transfer to **B**aseline. All appropriate values are held in the Baseline fields. As your project gets underway you can compare actual and rescheduled progress with the original baseline, following the guidelines in Chapter 5.

If the project schedule changes drastically, you can reschedule and save another baseline at any time. Just remember that this permanently erases the current baseline. If you only want to save a new baseline for a few tasks, display each Task Details and set the baseline from the Task Details Edit menu.

With the baseline saved, you are ready for the final step before starting the project—communicating your plan. Hopefully, all will agree with you and you can launch the project with smooth sailing ahead.

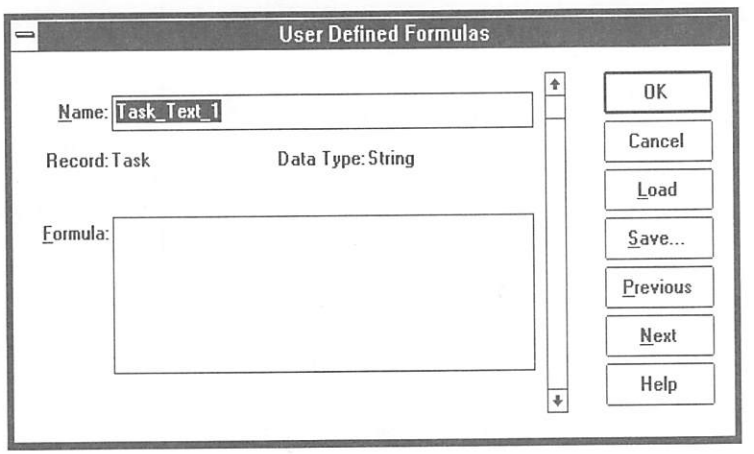
User Defined Fields

CA-SuperProject contains a fixed number of undefined fields. You can enter formulas and field references into these fields and define titles for them. There are five number fields, five text fields, five flag fields and five date fields for tasks, resource and assignments. The title and widths may be edited on the outline column layout screens.

User columns are initially placed at the end of the dialog and referred to as Integer-n, Text-n, Flag-n, Start Date-n, Finish Date-n, and Currency-n where n is a number 1-5.

For a complete description of user defined fields and project formulas, refer to the "Edit,Project Formulas" section in Chapter 3 of the *Reference Guide*.

The user-defined fields can be arranged in whatever column order you choose by using the Column Layout Options dialog. To define the fields and enter formulas into them, use the Edit,Project Formulas option. The Formula dialog box appears below:



Name: The name of the user-defined field. This name is used to reference the field in the following cases:

- User-defined formulas
- Select Criteria dialog
- DDE transfer
- Sorting dialog
- Macro data access commands
- Import/Export dialog
- Column layout dialog
- Goto column dialog

Record: The record type of the user-defined field. The types are Project, Task, Resource, and Assignments.

Data Types: The data type of the user-defined field. The types include:

- Integers
- Currency (format determined by current preferences)
- Start Date
- Finish Date
- String
- Flags

Formulas: The formula for the user-defined field.

Communicating the Plan

Your final planning step is communication. The project will never get off the ground unless all of the personnel responsible understand *what* is expected of them, *when*. Accountability is critical to a project's success. No matter how realistic the schedule, it will not happen unless all resources understand—and meet—their responsibilities and timeframe.

Who needs to know *what*? Your managers probably must approve the plan and its associated costs. All resources need to know their schedules, and mid-level managers should be aware of their subordinates' workload. CA-SuperProject lets you tailor reports to meet these differing needs.

Guidelines for Printing Reports, Charts

Charts and reports are formatted with *layouts*; they control the appearance of screen displays and output. You can load a prepared layout and customize it or create a layout "from scratch," starting with the current screen display.

Follow these guidelines for printing the current layout as a report or graphic chart:

1. Install available output devices (including character printers, graphics printers, plotters, and more).
2. Either load an existing layout with **Layout,Load** or start with the default View screen.
3. Modify the layout, if necessary, to suit your report's audience by using the **File,Page Layout** option.
4. Save the layout for future use with **Layout,Save**.
5. Select **File,Print View** to produce the chart or report.

To print an existing layout without loading it first, select **File,Print Reports**. Select the target layout from the list and print to screen, file, or other output device.

The next sections describe these basic printing steps. See "Communicating Progress" in Chapter 5 and "Defining Reports and Charts" in Chapter 6 for more about preparing reports and charts.

Installing Printers

You need to specify the printers you will use and indicate the computer output port used by each device. CA-SuperProject supports all output devices you can install under Windows or OS/2. To install and/or set up any output device for CA-SuperProject, refer to the *Microsoft Windows User Guide* or the *OS/2 User Guide*.

Formatting Reports and Charts

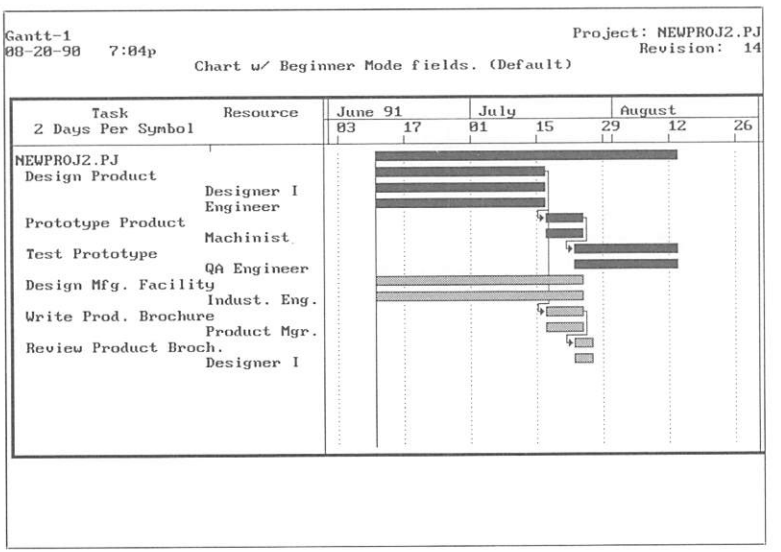
CA-SuperProject generates reports and charts from the current screen display. If you are sending output to a plotter, laser printer, or other graphics device, printouts closely resemble the current display. If you are using a character printer, CA-SuperProject translates the screen display into available characters.

Reports show project activity as data in columns, much like spreadsheet output:

Gantt-1 Project: NEWPROJ2.PJ
08-21-90 12:12p Revision: 14
Chart w/ Beginner Mode fields. (Default)

Task	Resource	Schd Dur	Task ID	Scheduled Start	Scheduled Finish
NEWPROJ2.PJ		45dy	P1	06-12-91> 8:00a	08-13-91 5:00p
Design Product		25dy	001	06-12-91 8:00a	07-16-91 5:00p
	Designer I	25dy	001	06-12-91 8:00a	07-16-91 5:00p
	Engineer	25dy	001	06-12-91 8:00a	07-16-91 5:00p
Prototype Product		5dy	003	07-17-91 8:00a	07-23-91 5:00p
	Machinist	5dy	003	07-17-91 8:00a	07-23-91 5:00p
Test Prototype		15dy	004	07-24-91 8:00a	08-13-91 5:00p
	QA Engineer	15dy	004	07-24-91 8:00a	08-13-91 5:00p
Design Mfg. Facility		30dy	005	06-12-91 8:00a	07-23-91 5:00p
	Indust. Eng.	30dy	005	06-12-91 8:00a	07-23-91 5:00p
Write Prod. Brochure		5dy	006	07-17-91 8:00a	07-23-91 5:00p
	Product Mgr.	5dy	006	07-17-91 8:00a	07-23-91 5:00p
Review Product Broch.		2dy	002	07-24-91 8:00a	07-25-91 5:00p
	Designer I	2dy	002	07-24-91 8:00a	07-25-91 5:00p

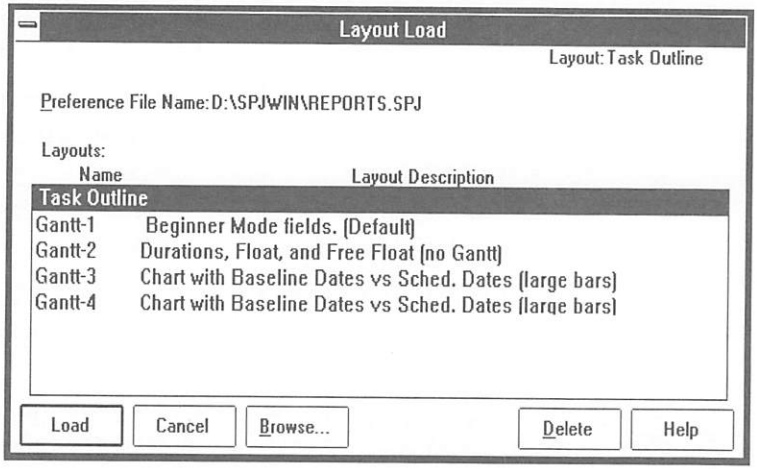
Charts are graphic illustrations of project activity. You will probably choose to prepare charts when presenting project information to higher management and others who need a "big picture" view without extensive detail. For example, this Gantt chart illustrates project activity over several months:



You can create reports and charts by loading and printing prepared layouts. Or, you can modify the current layout to create a custom report.

Loading Layouts

To display a list of all layouts for the current View screen, select Layout,Load:



Highlight your choice and press **Enter** or select the **Enter** button.

When you load a layout, the current screen changes to match its settings. If you're not familiar with layout contents, you can press **Ctrl–T** (for Layout,To Next Layout) to preview each layout for that View.

Modifying Layouts

Whether you want to modify an existing layout or create a new one, the Edit and Layout menus offer many options for formatting reports and charts. You can:

- Hide and show task, resource, date, and account levels. Use the gray + and - keys on the numeric keypad, or click the Hide and Show buttons on the Tool bar.
- Change the level of detail on Outlines or the subwindow display on Details and Calendar screens with **Ctrl–V** (for Layout,View Options or View Subwindows).
- Turn Outline field columns on and off, rearrange Outline columns, and sort Outline rows by selecting **L**ayout,**C**olumn Layout.
- Move PERT boxes and rearrange WBS Charts with **E**dit,**P**osition.
- Edit PERT and WBS box size, contents, shape, and color with **L**ayout,**P**ERT Layout, **L**ayout,**W**BS Layout, and **L**ayout,**B**ox Styles.
- On all Task, Resource, and Account Outlines, switch the Gantt column on and off with your *Show Gantt* selection on the General Preferences dialog box.
- Control Gantt appearance with **L**ayout,**G**antt Layout and **L**ayout,**B**ar Symbols. Click the Enlarge Gantt Scale button (for Layout,gantt Window Commands, Enlarge Gantt Scale) on the Tool bar to enlarge the timescale, or click the Reduce Gantt Scale button (for Layout,gantt Window Commands, Reduce Gantt Scale) to reduce it.
- Plot Cost/Resource Charts with **L**ayout,**H**istogram Symbols. Use **Ctrl–I** (for Layout,gantt Window Commands,Increase Cost/Rsrc) to increase the height of the chart window; **Ctrl–M** (for Layout,gantt Window Commands, Minimize Cost/Rsrc) minimizes it. You can also use the Split Windows Object to enlarge or reduce the chart window's height.

There are other possibilities for adjusting the format. For example, you can create a Crosstab report with up to four fields grouped under a common heading:

SOFTW3.PJ:Task Outline

Task	Resource	Programmer		
		Regular Hours	Overtime Hrs	Conflict Hrs
SOFTW3.PJ				
Develop schedule				
	Manager	0.00	0.00	0.00
	Supervisor	0.00	0.00	0.00
Code graphics module				
	Programmer	30.00	0.00	0.00
System test graphics				
	Programmer	18.00	0.00	2.00
Document bugs				
	Tester	0.00	0.00	0.00
Write graphics manual				
	Writer	0.00	0.00	0.00
Final product test				
	Tester	0.00	0.00	0.00
Ship software		0.00	0.00	0.00
TOTAL		48.00	0.00	2.00

"Defining Reports and Charts" in Chapter 6 provides instructions for setting the Crosstab fields on the Outline Layout dialog box.

Or, you might want to sort the rows of your report by Scheduled Start date, Total Cost, or some other field. See "Sorting Outline Rows" in Chapter 6 for instructions.

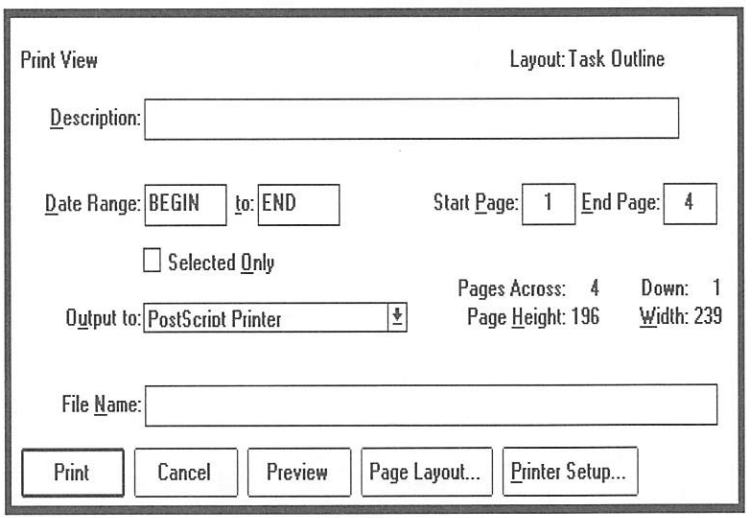
You can also use CA-SuperProject's Select Criteria feature to limit reported data, for example, to select tasks with a certain resource assigned or tasks starting in a certain month. "Select Menu" in Chapter 2 of the *Reference Guide* contains details.

Saving New Layouts

When a customized layout is finished, you can save it for future use. Select **Layout,Save** and enter a unique name, for example, SCHEDSUMGNT for Schedule Summary Gantt. You can display saved layouts for each View screen with **Layout,Load**, or you can select **File,Print Reports** to print any layout without loading it first.

Printing Reports and Charts

To output the current screen layout, select **File,Print View**. The Output dialog box displays:



You can:

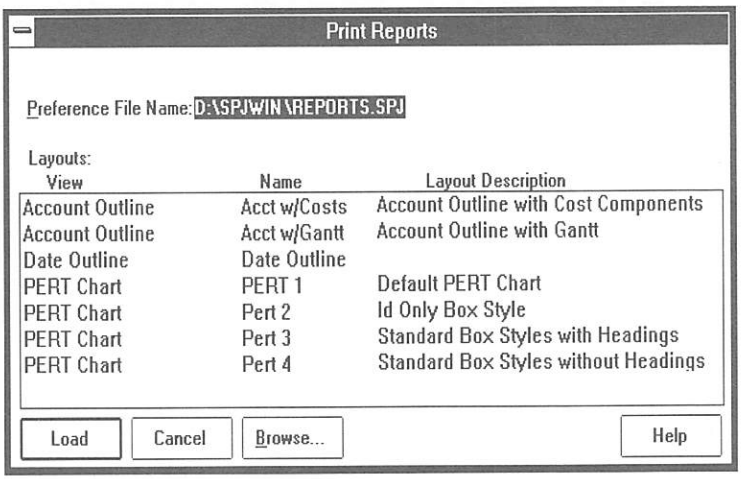
- Enter a title in the space after *Description:*
- Enter a *Date Range:* (for Gantt Charts and Crosstabs).
- Print part of a file by entering a *Start Page:* and *End Page:*.
- Use *Selected Only* to print only tasks, resources, assignments, dates, or accounts highlighted with Select options.

- Select the *Output to:* destination file by clicking the listbox's Scroll arrow. The listbox expands to display all the possible file types. Click on your choice. The listbox closes and the file type displays in the *Output to:* field.
  - Text File produces an ASCII file for horizontal printing with CA-SuperProject's SIDEWAYS utility program. You can also import the file into word-processing and spreadsheet programs.
  - Select another file type for direct compatibility with listed spreadsheet and database programs: CA-SuperCalc, dBase, Lotus 1-2-3, and Multiplan. CSV (Comma Separated Values) files are readable by BASIC programs and can be imported into many application programs.

When you select one of the "Installed..." options, the device name displays to the right next to *Device*. Enter the name of this layout in the *File Name:* field.

"File,Print View" in Chapter 2 of the *Reference Guide* provides more information about the Output dialog box options.

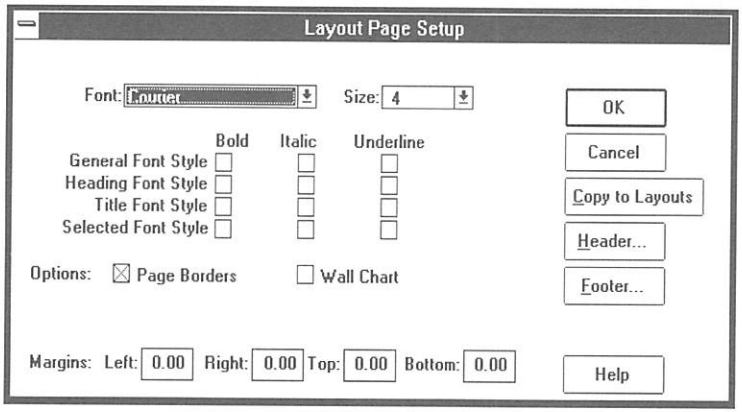
To output charts and reports independent of the current View, select File,Print Reports. The Report Selection dialog box appears:



It lists available graphic and columnar layouts for all Views. When you choose a report, the Output dialog box displays. Select its options and continue printing as described earlier for File,Print View.

Page Layout

The Page Layout command lets you determine the various parameters for your printed page, such as the type of font, point size, and formatting. When you select this command from the File menu or from the Print,View dialog, the following dialog box displays:



Font

Open this listbox by clicking it with your mouse. The list of fonts displays. Clicking a font selects it and closes the listbox.

Size

Open this listbox by clicking it with your mouse. A list of point sizes for your fonts displays. You can browse the listbox by clicking the Vertical Scroll arrows. The range of point sizes is from 4 to 72. Clicking a point size selects it and closes the listbox.

Font Style

The dialog box also gives you the option of selecting Bold, Italic, and Underline character formatting. The formatting options can be applied to the General Font Style, Heading Font Style, Title Font Style, and the Selected Font Style. Click the appropriate box to select the formatting style.

Options

This section of the dialog box lets you select/deselect various options for your document.

Page Borders

When selected, this option displays border lines.

Wall Chart

Prints the title, column headings, and row headings only on the first page (without repeating), so you can join printed pages together to form a single large chart.

Margins

By selecting the appropriate fields, you can enter numerical values for the Left, Right, Top, and Bottom margins. The default setting for the margins is 0.00.

Headers

Selecting the Headers button displays a separate dialog box. The dialog box lets you place headers in the position on the page (left, right, or center) you want and select fonts, size, and formatting for the header.

Footers

Selecting the Footers button displays a separate dialog box. The dialog box lets you place footers in the position on the page (left, right, or center) you want and select fonts, size, and formatting for the footers.

What Next?—Progress Tracking

Your project is scheduled, you have set the baseline, and communicated the plan to others. Now, it is time for the next phase, comparing planned and actual progress. You will prepare and evaluate status reports, look for activity behind and ahead of schedule, and take corrective action as needed. Chapter 5 explains these tracking procedures, which form the heart of project management.

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Project Tracking

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Chapter 5
Project Tracking

What's in This Chapter?

Chapters 3 and 4 show how to build the project database and schedule project activity. The last sections of Chapter 4 explain how to save a project baseline for later comparisons and how to communicate the final plan.

This chapter describes the next phase of project management—tracking and controlling progress after the project is underway. You will learn about entering and displaying actual dates and costs, and how to compare actual versus planned progress.

If your project goes off track and moves slower than expected, you will find suggestions on how to recover lost ground. Finally, you will learn to use charts and reports to communicate project cost and schedule status.

Guidelines for Project Tracking

Follow these steps for entering actual data, comparing actual with planned activity, and taking corrective action if problems occur:

1. *Before the project starts*, select **P**references,Expert Modes,**B**aseline Compare from the menu to display the Baseline fields. Then, display the Task Outline screen and select Edit,**T**ransfer to Baseline from the menu to save the final project plan for later comparisons.
2. Select **P**references,Expert Modes,**T**racking/Actuals from the menu to turn on the Actual fields for real project data.

3. Enter Actual Start dates for each on-going and dates wherever they differ from planned activity, or
4. Manually enter project actuals on a regular basis and compare with planned activity; periodically enttask, or select *Auto Actuals* on the Preferences,Calculation Options menu and let the program enter Actual dates.
5. After recalculating, review the Task Status column for any schedule conflicts.
6. Manage by exception: gather project information, compare against planned activity, and enter actual costs er the hours worked to date on each assignment in the Actual Effort field.
7. Enter Actual Finish dates as each task finishes, or select *Auto Actuals* on the Preferences,Calculation Options menu to have the program enter them.
8. Take corrective action whenever a discrepancy occurs between planned and actual activity.
9. Communicate project status on a regular basis.

Displaying Actual Dates and Costs

Planning is essential, but rarely is a plan followed to the letter; materials arrive late, work takes longer than expected, and personnel shift from task to task. It helps to stay on top of the project by updating the schedule with Actual Start and Finish dates, Actual Effort worked to date, and Actual Costs. Before you start entering Actual data, be sure to set the project baseline. See "Saving the Baseline" in Chapter 4 for instructions. Then, you can compare each task's estimated progress with actual project activity.

Procedure: To start tracking project Actuals, select Preferences,Expert Modes, Tracking/Actuals from the menu. This command displays Actual date, effort, and cost fields on the Task Outline. You can scroll to these fields or select Layout,Outline Layout from the menu to hide the Gantt column and display Actuals immediately after the Task Name and Resource.

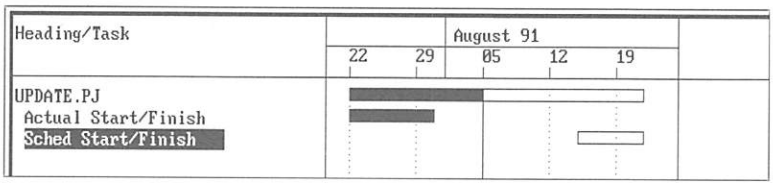
Entering Actuals

You can enter actual data directly into the Task Outline fields, or let CA-SuperProject automatically update the Actuals fields. Many project managers prefer to combine these methods and "manage by exception." They use automatic updating as long as an activity is proceeding on schedule. As soon as actual activity differs from planned (the baseline), they enter Actuals manually for maximum accuracy.

Automatic Updating

After an Actual Start is entered, the program evaluates all activity in relation to the ***Current Date*** entry on the Preferences,Calculation Options screen.

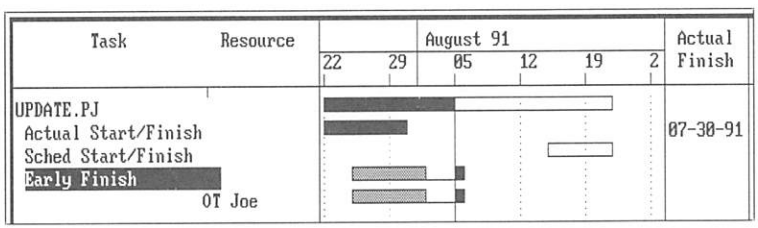
This date, generally today's, is the dividing line between Actual and Scheduled dates in CA-SuperProject. Everything before the current date is considered completed or actual activity, shown here as solid bars:



If *Auto Actuals* is selected on the **P**references,**C**alculation Options dialog box, Actual hours and cost data are automatically updated depending on what part of an assignment is complete. For example, if four days of an assignment's duration have passed, then Actual Assignment Total Hours is equal to the hours assigned during those four days. See the "Auto Actuals" section later in this chapter for more information.

You will probably choose to rely on calculated Actual durations and hours while a task remains on schedule. When actual task activity differs from the baseline, though, you can update Actuals manually to tell CA-SuperProject exactly what is going on.

Example: If you have estimated that a task will take six days (48 hours), but you have assigned a person overtime—so he/she works 12 hours per day including four hours of overtime—at the end of the fourth day you can enter **48** for Actual Resource Total Hours. The Task Outline Gantt column shows that all work has been completed—just enter an Actual Finish to close the task:



Or, if a resource has been ill and has only been able to put in half of the anticipated hours on one task by a certain date, enter the Actual Hours for that assignment—CA-SuperProject will evaluate the situation and change Task Status to "Interrupted," if appropriate. See "Checking Task Status," later in this chapter.

After you have manually entered Actual duration, hours, or cost, you must continue updating them manually. To resume automatic updating, press **Del** to clear the manual entry and display calculated data.

Auto Actuals

In Auto Actuals mode, CA-SuperProject enters an Actual Start date when a task's Scheduled Start is before the current date. When the Scheduled Duration has passed and the current date is later than the Scheduled Finish, the program enters an Actual Finish. This occurs only at the beginning of the calculation process.

Auto Actuals only enters data for fields not entered. It does not override Actual dates you have already entered, as long as you have calculated the schedule with your original Actual dates.

If a task or assignment starts earlier or later than planned, you can manually enter the Actual Start. Automatic updating continues as described in the previous section and an Actual Finish is entered when the Scheduled Finish date occurs.

Procedure: To turn on Auto Actuals mode, select Preferences,Calculation Options from the menu, then select *Auto Actuals*.

With *Auto Actuals* off, you must manually enter Actual Start and Finish dates. If a Scheduled Start or Finish date passes without a manual entry, the task or assignment shows delay.

Checking Task Status

CA-SuperProject compares the Actual and Scheduled portions of a task and records its current condition in the Status field. The first part of the Status field is the Progress code: Sched (Scheduled), Prog (In Progress), Intr (Interrupted), or Done (Task Finished). Up to three other codes can display to indicate other conditions: Crit (Critical Task), Cnf (Resource Conflict; Overscheduled Resource), and Neg (Schedule Conflict; Negative Float or Delay).

For example, these are both valid Task Status entries:

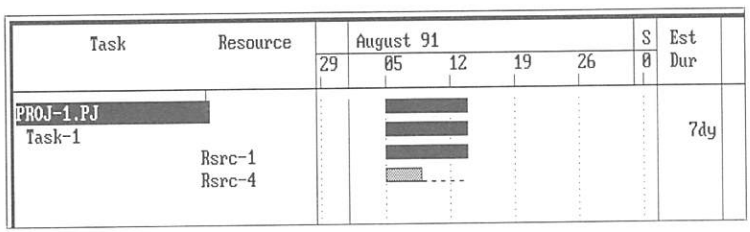
Schd/Crit/Cnf/Neg
Prog/ / /Neg

The next sections describe and illustrate each of these conditions.

Progress

Schd (Scheduled)

The task has been created, but work has not yet begun; there is no Actual Start. Here is a Task Gantt with a current date of August 1 (indicated by the vertical solid line), showing that Task-1 is scheduled to start in the future (August 5):



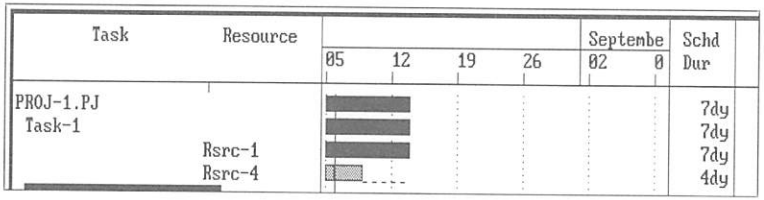
The Status displays as:

Task	Resource	Schd Dur	Status	Scheduled Start	Actual Start
PROJ-1.PJ		7dy		08-05-91>	
Task-1		7dy	Schd/Crit	08-05-91=	
	Rsrc-1	7dy	Schd/Crit	08-05-91	
	Rsrc-4	4dy	Schd	08-05-91	

Notice that Rsrc-1 is scheduled to work seven days (the duration of the task) and Rsrc-4 is only scheduled for four days with three unassigned days.

Prog (In Progress)

An Actual Start date is entered, but no Actual Finish date is entered. Until an Actual Finish date is entered, task status is considered either In Progress or Interrupted. Here, an Actual Start of August 5 has been entered on the day of August 6:



Status displays as:

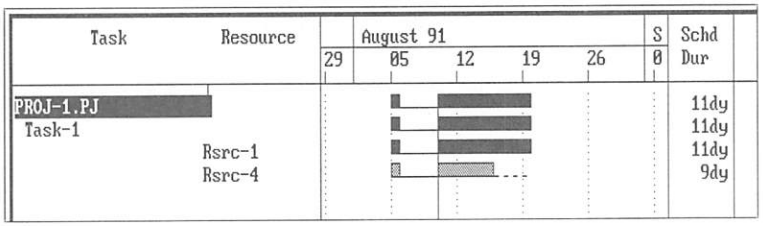
Task	Resource	Schd Dur	Status	Scheduled Start	Actual Start
PROJ-1.PJ		7dy		08-05-91>	08-05-91
Task-1		7dy	Prog/Crit	08-05-91=	08-05-91
	Rsrc-1	7dy	Prog/Crit	08-05-91	08-05-91
	Rsrc-4	4dy	Prog	08-05-91	08-05-91

[If no entries are made in the Actual Duration or Actual Hours fields, CA-SuperProject will assume that work is continuing on schedule and will maintain In Progress status for a task, calculating Actual Duration and Actual Effort based on lapsed time between the Actual Start and the current date.

Intr (Interrupted)

Let's continue our example: By August 10 there has been an Actual Duration entry of one day, but no more entries. This tells CA-SuperProject that the pace of actual activity has not kept up with the original schedule. CA-SuperProject changes Progress status to Interrupted to show that the entered

Actuals are less than what could have been worked:



Status displays as:

Task	Resource	Status	Scheduled Start	Actual Start	Actual Dur
PROJ-1.PJ			08-05-91>	08-05-91	1dy
Task-1		Intr/Crit	08-05-91=	08-05-91	1dy
	Rsrc-1	Intr/Crit	08-05-91	08-05-91	
	Rsrc-4	Intr	08-05-91	08-05-91	

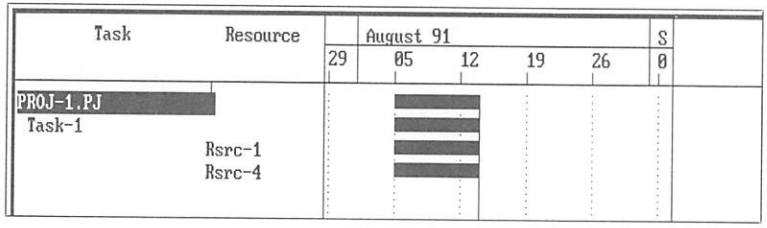
In this case the task is split into work finished and work remaining. ***If Set Resume Date as Scheduled Date*** is selected on the Preferences,Calculation Options screen, the Scheduled Start date becomes the date work is expected to resume (generally the current date). If ***Set Resume Date as Scheduled Date*** is not selected, the Scheduled Start date is set to the Actual Start date.

Done (Task Finished)

The task is finished; an Actual Finish date has been entered. If ***Auto Actuals*** is selected on the Preferences,Calculation Options screen, a task receives Done status as soon as Actual Hours equal the total hours scheduled for that task.

If ***Auto Actuals*** is not selected, when assignment Actual Hours equal the scheduled total hours, all work will show in the past (before the current date), but the task is not yet closed.

To close the task and change its status to Done, enter an Actual Finish date. Then, the Actual Start and Finish dates will be entered into the Scheduled Start and Finish fields and all work will show in the past:

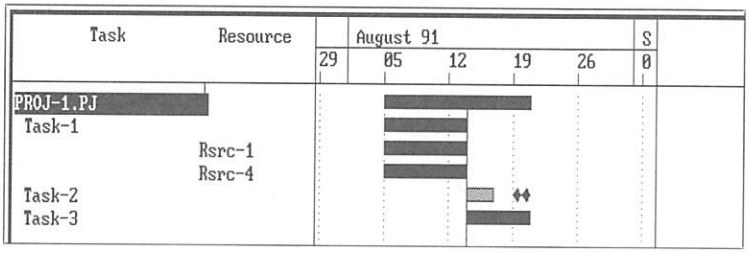


Status displays as:

Task	Resource	Status	Actual Start	Actual Finish	Actual Dur
PROJ-1.PJ			08-05-91	08-13-91	7dy
Task-1		Done/Crit	08-05-91	08-13-91	7dy
	Rsrc-1	Done/Crit	08-05-91	08-13-91	
	Rsrc-4	Done/Crit	08-05-91	08-13-91	

Crit (Critical Task)

The task has no float or free float and is on the project's critical path. If the task is delayed, the project or a critical milestone is delayed also:



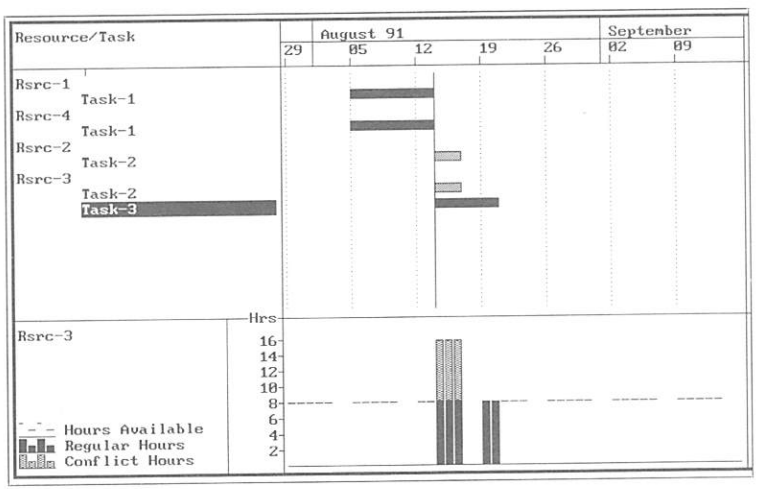
Status displays as:

Task	Resource	Status	Scheduled Start	Scheduled Finish	Schd Dur
PROJ-1.PJ			08-05-91>	08-20-91	12dy
Task-1		Done/Crit	08-05-91=	08-13-91	7dy
	Rsrc-1	Done/Crit	08-05-91	08-13-91	7dy
	Rsrc-4	Done/Crit	08-05-91	08-13-91	7dy
Task-2		Schd	08-14-91	08-16-91	3dy
Task-3		Schd/Crit	08-14-91	08-20-91	5dy

Task-3 is critical; Task-2 is not. If "Crit" does not display in the Status field, the task has float or free float and can slip a certain amount without delaying the project.

Cnf (Resource Conflict)

"Cnf" status indicates that one of the task's assigned resources is scheduled for more hours per day than the total of the standard work day plus scheduled overtime:



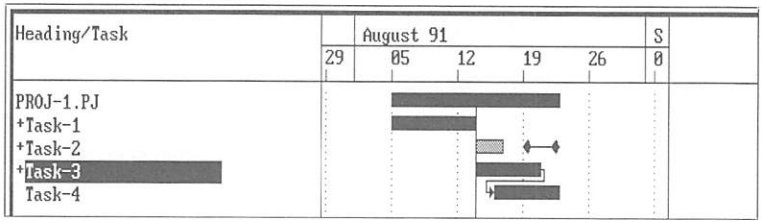
Status displays as:

Task	Resource	Status	Scheduled Start	Scheduled Finish	Schd Dur
PROJ-1.PJ			08-05-91>	08-20-91	12dy
Task-1		Done/Crit	08-05-91=	08-13-91	7dy
	Rsrc-1	Done/Crit	08-05-91	08-13-91	7dy
	Rsrc-4	Done/Crit	08-05-91	08-13-91	7dy
Task-2		Schd	08-14-91	08-16-91	3dy
	Rsrc-3	Schd	08-14-91	08-16-91	3dy
	Rsrc-2	Schd	08-14-91	08-16-91	3dy
Task-3		Schd/Crit/Cnf	08-14-91	08-20-91	5dy
	Rsrc-3	Schd/Crit/Cnf	08-14-91	08-20-91	5dy

If "Cnf" does not display in the Status field, that task has no overscheduled resource.

Neg (Schedule Conflict)

"Neg" status (for Negative Float or Start Delay) indicates a schedule conflict. Must dates or other constraints force a task to start or finish before the scheduled dates based on precedence:



Status displays as:

Heading/Task	Status	Scheduled Start	Scheduled Finish	Schd Dur
PROJ-1.PJ		08-05-91>	08-22-91	14dy
+Task-1	Done/Crit	08-05-91=	08-13-91	7dy
+Task-2	Schd	08-14-91	08-16-91	3dy
+Task-3	Schd/Crit/Cnf/Neg	08-14-91	08-20-91	5dy
Task-4	Schd/Crit	08-16-91=	08-22-91	5dy

If "Neg" does not display, the task does not have Negative Float or Delay.

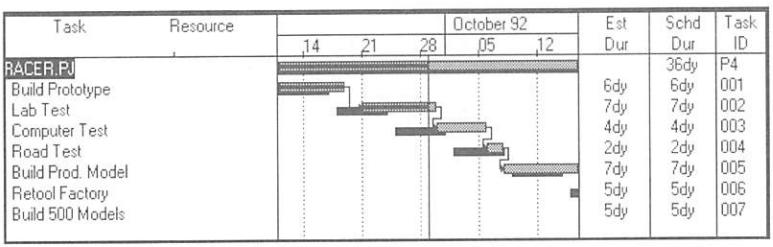
Comparing Progress: Actual vs. Planned

After you have set the project baseline and the project is underway, progress comparisons are essential to project management. They help pinpoint tasks that are in trouble and form the basis for management decisions. If some activities are ahead of schedule and under budget, perhaps you have resources for "fighting fires" in the trouble zones.

You will typically want to use these field types for comparisons: Scheduled, Actual, and Baseline (planned activity). While you can display PERT and WBS Chart boxes with either Scheduled, Actual, or Baseline fields, you will use the Outline screens for comparing progress. For graphic comparisons, use the Outline Gantt and Cost/Resource Graph. Outline columns are convenient for comparing data entries and printing status reports. At any time, you can select **File,Print View** from the menu to print the current Outline or save a report file to disk.

Comparing on the Gantt

To compare baseline and actual progress, display the Task Outline and go through the steps outlined earlier in this chapter in the "Guidelines for Project Tracking" section. The following project file is an example of how to do this:



Two Gantt bars display for each activity: Scheduled/Actual (top), and Baseline (bottom).

If you want to show more time for each Gantt symbol, then move from days to weeks. For example, press the Reduce Scale Tool bar button or **Ctrl–R** (Reduce Gantt Scale). To show less time for each symbol, press the Enlarge Scale Tool bar button or **Ctrl–E** (Enlarge Gantt Scale).

Schedule Exceptions

Look for activities where the Baseline bar starts earlier than the Scheduled/ Actual bars. The Baseline extends to the left of the other bars, as demonstrated in the tasks in the previous example. These tasks and assignments are late. If another bar extends to the left of the Baseline, that activity is running ahead of schedule.

Cost/Resource Chart

To chart costs beneath the Gantt, choose **P**references,**G**eneral Options from the menu and select *Show Cost Fields*. On the Cost/Resource Chart you can display Baseline Cost as a filled step graph with Scheduled/Actual Total Cost as a solid line overlaying it. If the line rises above the step, there is a cost overrun. If the line stays below the step, the total project is within the budget for that time period.

Use the mouse to point to the bottom of the up/down scroll bar. The pointer symbol changes to a split object. Press the mouse button and drag the split object up or down to increase or decrease the chart height (or use **L**ayout,**H**istogram Symbols from the menu and select the appropriate options).

You can also press **Ctrl–I** (Increase Cost/Rsrc) repeatedly to increase the height of the Cost/Resource Chart. **Ctrl–M** (Minimize Cost/Rsrc) decreases its height and increases the height of the Gantt.

The Layout,Histogram Symbols dialog box also lets you control the height of the Gantt. The *Height:* field has a default value of MIN, or minimum. You can enter MAX into this field, which makes the Gantt full screen, or enter a numerical value. The numerical value indicates the height in characters of the Gantt.

Comparing with Outline Fields

The Task Outline columns are convenient for comparisons. You can choose from several prepared layouts, or create your own ("Defining Reports and Charts" in Chapter 8 contains instructions). Remember, you can select File,Print View from the menu at any time to print a report with the current layout.

Comparing Planned and Actual Dates

To display Scheduled, Actual, and Baseline dates for each activity, select Layout,Load,**Compare Dates** from the menu:

Heading/Task	Status	Scheduled Start	Actual Start	Baseline Start
PROJ-1.PJ		08-05-91>	08-05-91	08-01-91
+Task-1	Done/Crit	08-05-91=	08-05-91	08-05-91
+Task-2	Schd	08-14-91		08-01-91
+Task-3	Schd/Crit/Cnf/Neg	08-14-91		08-01-91
Task-4	Schd/Crit	08-16-91=		08-16-91

In this example, Start dates display in the date fields.

If a task or assignment has already started, you can compare Actuals to Baselines; otherwise, compare Scheduled dates with the Baseline dates.

Comparing Planned and Actual Effort

To compare Baseline, Scheduled, and Actual resource work time, display the Task Outline and select Layout,Load,**Compare Hours** from the menu:

Task	Resource	Status	Sched Rsrc Total Hrs	Actual Rsrc Total Hrs
PROJ-1.PJ			200.00	112.00
Task-1		Done/Crit	112.00	112.00
	Rsrc-1	Done/Crit	56.00	56.00
	Rsrc-4	Done/Crit	56.00	56.00
Task-2		Schd	48.00	0.00
	Rsrc-3	Schd	24.00	0.00
	Rsrc-2	Schd	24.00	0.00
Task-3		Schd/Crit/Cnf/Neg	40.00	0.00
	Rsrc-3	Schd/Crit/Cnf/Neg	40.00	0.00
Task-4		Schd/Crit	0.00	0.00

You can always switch off hours by choosing Preferences,Date & International Formats from the menu and setting *Time Format* to **None**. But for now, load **Compare Hours** on the Resource Outline:

Resource/Task	Status	Sched Rsrc Total Hrs	Actual Rsrc Total Hrs
Rsrc-1		56.00	56.00
Task-1	Done/Crit	56.00	56.00
Rsrc-4		56.00	56.00
Task-1	Done/Crit	56.00	56.00
Rsrc-2		24.00	0.00
Task-2	Schd	24.00	0.00
Rsrc-3		64.00	0.00
Task-2	Schd	24.00	0.00
Task-3	Schd/Crit/Cnf/Neg	40.00	0.00

Comparing Planned and Actual Costs

Layout **Compare Costs** displays Scheduled, Actual, and Baseline cost fields on the Task Outline:

Task	Resource	Status	Scheduled Total Cost	Actual Total Cost
PROJ-1.PJ				
Task-1		Done/Crit		
	Rsrc-1	Done/Crit	1400.00	1400.00
	Rsrc-4	Done/Crit	1400.00	1400.00
Task-2		Schd		
	Rsrc-3	Schd	600.00	0.00
	Rsrc-2	Schd	600.00	0.00
Task-3		Schd/Crit/Cnf/Neg		
	Rsrc-3	Schd/Crit/Cnf/Neg	1000.00	0.00
Task-4		Schd/Crit	0.00	0.00
TOTAL			$ 5000.00	$ 2800.00

Before you load it, choose Preferences,General Options from the menu and verify that ***Show Cost Fields*** is selected.

Using Select Criteria

When viewing any layout, you can use the Select Criteria feature to filter the display and/or output. For example, you can select all tasks with a Scheduled Finish later than July 19, 1992 or all jobs assigned to Jameson Company. "Select Menu" in Chapter 2 of the *Reference Guide* tells more about Select Criteria.

Getting Back on Track

Project management is a continuous cycle of updating the plan with current costs and dates, examining the impact actual events have on the original plan, adjusting plan to meet new deadline and budget limitations, then communicating the revised plan to the appropriate people.

If you find that some of your project activities are falling behind, the best you can do is to evaluate the situation and find the most efficient way to work around the obstacles. CA-SuperProject can "plug in" various options to see how they affect your schedule and costs. This way, you can try alternatives until you find the one that fits best.

It is wise to experiment with a copy of your project. First, save the project under its current name to preserve any recent changes, then save it under a new name to create the copy.

It is important to evaluate all of your options, but be realistic as to what can and cannot be done. The decisions that you make with each revision should consider your resource workloads, budget limitations, and employee productivity.

Rob from Peter...to Finish Paul

Can you pull someone off of a task of lesser-importance to alleviate a bottleneck? Sometimes you have to juggle personnel just to put out fires, but keep in mind that this could backlash, causing other tasks to run late. Beware of this "domino effect."

You can also borrow time from future tasks, but be careful you do not overdraw the bank! If a current task eats up most of the time allotted to a future task, where can you borrow time for the future task?

Still Need Help?

What if your project still has cost and time overruns—what now? Can you exceed the budget? Should the project be scrapped? If the project is important enough, perhaps you can add contract workers or approve overtime. It is important to know where to draw the line, and examine the effects of each alternative.

Communicating Progress

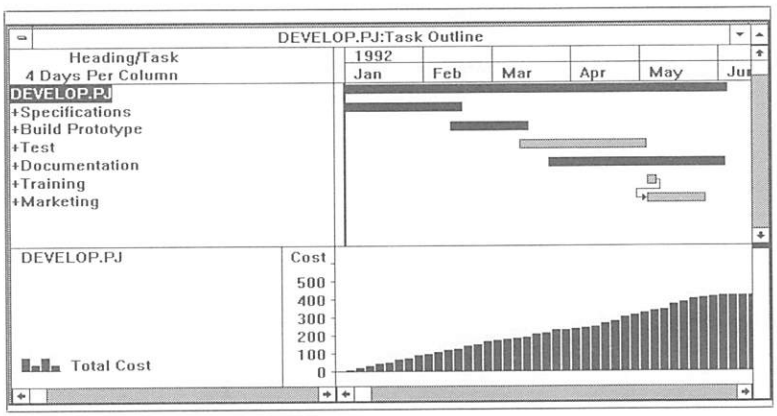
Your company may already have guidelines for preparing status reports: how often they are to be released, and what they should contain. If not, you will probably want to establish your own guidelines.

Managers responsible for each activity appreciate detailed schedule and cost reports like the one shown here:

GANTT-1 Project: BIKER.PJ
09-14-90 4:44p Revision: 55
Chart w/Beginner Mode Symbols (Default)

Task	Resource	Est Dur	Schd Dur	Task ID	Scheduled Start
BIKER.PJ			65dy	P28	08-14-91> 8:00a
Design			10dy	001	08-14-91 8:00a
Build Market Profile		5dy	5dy	006	08-14-91 8:00a
	Mkting Dept.		5dy	006	08-14-91 8:00a
Analyze Competition		5dy	5dy	007	08-14-91 8:00a
	Mkting Dept.		5dy	007	08-14-91 8:00a
Finalize Specs.		10dy	10dy	008	08-14-91 8:00a
	Design Group		10dy	008	08-14-91 8:00a
Prototype			10dy	002	08-28-91 8:00a
Select Eng. Team		5dy	5dy	009	08-28-91 8:00a
	Eng. Group		5dy	009	08-28-91 8:00a
Buy Prod. Materials		5dy	5dy	010	08-28-91 8:00a
	Prod. Mater.		5dy	010	08-28-91 8:00a
Build Prototype Model		10dy	10dy	011	08-28-91 8:00a
	Eng. Group		10dy	011	08-28-91 8:00a

Upper management may benefit more from charts:



"Communicating the Plan" in Chapter 4 of this guide introduces CA-SuperProject's reporting and charting features. In addition, "Printing Reports and Charts" in Chapter 4 tells how to print the current screen layout with **File,Print View** from the menu.

The next sections describe some special status reports and charts.

Status Reports

CA-SuperProject's "What You See Is What You Get" capability means that reports are generated from the current Outline row and column arrangement. See "Comparing with Outline Fields" earlier in this chapter for several screen/ report layouts you can load. "Defining Reports and Charts" in Chapter 6 describes how you can customize existing layouts to show exactly the information you need.

In Hindsight...Evaluating the Project

Your final project management step is evaluation. When you are finally finished, there is a chance to learn from your mistakes. Do not omit the review process, as it will make future decisions more realistic.

Not Enough Time?

Did you underestimate how long a task needed? Were there hidden delays that should have been uncovered during project planning?

Dependencies

Were the relationships between the tasks realistic? Were tasks scheduled to start before prerequisites were met? Were there tasks waiting needlessly on unrelated tasks to finish?

Audition vs. Performance

How accurate was your assessment of each employee's abilities —both in workload and in quality? Were the tasks assigned to the appropriate personnel, or did you misjudge certain skills required? Were some resources over or undermanaged?

Unforeseen Delays

Were there problems with inventory or material deliveries that, with a little research, you could have uncovered? What about substandard quality levels?

Asking these critical questions can determine areas that need special attention next time, so projects will run smoothly with fewer setbacks.

What Next?

You've now learned most of CA-SuperProject's features. The next chapter introduces specialized features for government contractors and others who manage projects with many tasks and/or shared resources.

Summary

This chapter showed you how to track your project using CA-SuperProject. It described some general guidelines, how to display and enter actual dates, how to check task status, how to compare actual versus planned progress, and how to print the plan.

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Advanced Features

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Chapter 6
Advanced Features

What's in This Chapter?

Chapters 3 through 5 introduce CA-SuperProject's most-used features for planning and tracking projects. They explain how to enter project data and format reports or charts with prepared layouts.

This chapter describes the Date and Account Outlines, presents basic procedures for designing your own reports and charts, and introduces Earned Value Analysis for government contractors.

Using Date and Account Outlines

Most project building and tracking activities focus on the Task and Resource Outlines. You will use the Date and Account Outlines less often, but they are helpful for preparing special schedule and costing reports. Here is an overview of what they show and how to use them. Chapter 3 of the *Reference Guide* tells more about all four Outlines.

Date Outline

In Expert Mode, the Date Outline shows project activity—task/resource assignments—by time interval:

AUTOTEST.PJ:Date Outline

Date / Task	Resource	Schd Dur	Task ID	Scheduled Start	
+1990					
1991					
+ 1st Qtr '91					
2nd Quarter					
Lab Test		1mo	008	03-21-91	8:00a
Computer Test		1mo	009	04-22-91	8:00a
Road Test		1mo	010	05-22-91	8:00a
Retool Factory	Steel	2mo	011	06-21-91	8:00a
3rd Quarter					
Retool Factory	Steel	2mo	011	06-21-91	8:00a
Retrain Workers		2mo	012	08-22-91	8:00a
4th Quarter					
Retrain Workers		2mo	012	08-22-91	8:00a
Buy New Materials	Aluminum	2mo	013	10-23-91	8:00a
Produce 200 Models		2mo	014	12-24-91	8:00a

It is useful for preparing summary reports with little detail, as shown above, or task assignment sheets with a high level of detail:

AUTOTEST.PJ:Date Outline

Date / Task	Resource	Schd Dur	Task ID	Scheduled Start	
Week-24					
Road Test		1mo	010	05-22-91	8:00a
Week-25					
Road Test		1mo	010	05-22-91	8:00a
Retool Factory	Steel	2mo	011	06-21-91	8:00a
Week-26					
Retool Factory	Steel	2mo	011	06-21-91	8:00a
3rd Quarter					
July 91					
Week-27					
Retool Factory	Steel	2mo	011	06-21-91	8:00a
Week-28					
Retool Factory	Steel	2mo	011	06-21-91	8:00a
Week-29					
Retool Factory	Steel	2mo	011	06-21-91	8:00a
Week-30					
Retool Factory	Steel	2mo	011	06-21-91	8:00a

You can easily change the level of detail by hiding and showing date levels in rows.

Hiding and Showing Date Levels

When you first use CA-SuperProject or load the default Date Outline layout, there is one level of time intervals—years. Below each year is a list of all task/ resource assignments active during that year:

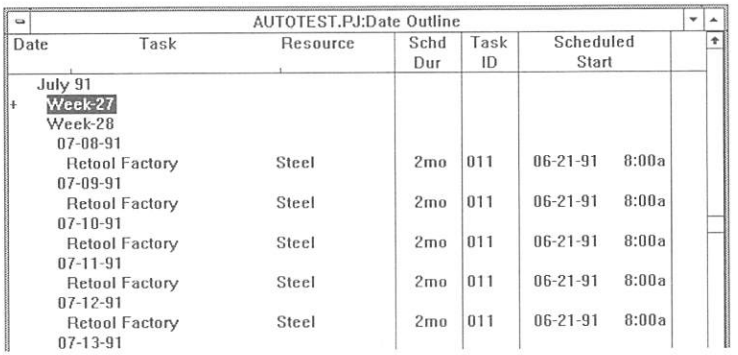
AUTOTEST.PJ:Date Outline

Date	Task	Resource	Schd Dur	Task ID	Scheduled Start	
+1990						
1991						
	Prototype		1mo	005	12-19-90	8:00a
	Implement		1mo	006	01-18-91	8:00a
	Final Test		1mo	007	02-19-91	8:00a
	Lab Test		1mo	008	03-21-91	8:00a
	Computer Test		1mo	009	04-22-91	8:00a
	Road Test		1mo	010	05-22-91	8:00a
	Retool Factory	Steel	2mo	011	06-21-91	8:00a
	Retrain Workers		2mo	012	08-22-91	8:00a
	Buy New Materials	Aluminum	2mo	013	10-23-91	8:00a
	Produce 200 Models		2mo	014	12-24-91	8:00a
1992						
	Produce 200 Models		2mo	014	12-24-91	8:00a

Procedure: To show other levels—quarters, months, weeks, days—press **Alt–Shift–Right Arrow** or click the Show button on the Tool bar. Each time you press these keys another level "unrolls." Press **Alt–Shift–Left Arrow**— or click the Hide button on the Tool bar to show fewer levels. You can also hide and show assignments for selected time intervals.

Example: Suppose you are displaying months, weeks, and days and want to make a weekly assignment list for the month of July but you do not want to show assignments for the first week.

Highlight the first week and press the minus (-) key on the numeric keypad. The days and their assignments "roll up" into the week:



AUTOTEST.PJ:Date Outline

Date	Task	Resource	Schd Dur	Task ID	Scheduled Start	
July 91						
+ Week-27						
Week-28						
07-08-91						
	Retool Factory	Steel	2mo	011	06-21-91	8:00a
07-09-91						
	Retool Factory	Steel	2mo	011	06-21-91	8:00a
07-10-91						
	Retool Factory	Steel	2mo	011	06-21-91	8:00a
07-11-91						
	Retool Factory	Steel	2mo	011	06-21-91	8:00a
07-12-91						
	Retool Factory	Steel	2mo	011	06-21-91	8:00a
07-13-91						

You can hide weeks under months the same way; just highlight the month and press the minus (-) key. A plus sign (+) shows before each time interval with hidden data.

To show more detail again, highlight a row with hidden data and press the plus (+) key on the numeric keypad.

Printing and Saving Date Outline Layouts

Remember, you can print your display at any time with File,Print View. Select Layout,Save to save the layout for future use. Give it a descriptive name like "Weekly Summary" so you can easily retrieve it with Layout,Load.

Account Outline

In Expert mode, the Account Outline lets you group project assignments according to your company's Account Codes or any similar division.

Example: Suppose an accounting system is grouped by functional operation or activity within departments:

01 Marketing
- *01 Design*
- *02 Sales*
- *03 Development*
- *04 Production/Manufacturing*
- *05 Other*

02 Development
- *01 Design*
- *02 Sales*
- *03 Development*
- *04 Production/Manufacturing*
- *05 Other*

03 Production
- *01 Design*
- *02 Sales*
- *03 Development*
- *04 Production/Manufacturing*
- *05 Other*

A sample Account Outline looks like this, using CA-SuperProject's default Account Mask to generate Account Codes:

BIGBIKE.PJ:Account Outline

Account	Task	Resource	Schd Dur	Task ID	Scheduled Start	
0000.01.00.00.00		Marketing				
0000.01.01.00.00		Design				
	Build Market Profile	Mkting Dept.	5dy	006	07-29-91	8:00a
	Analyze Competition	Mkting Dept.	5dy	007	07-29-91	8:00a
0000.01.02.00.00		Sales				
0000.01.03.00.00		Prod/Mfg.				
0000.01.04.00.00		Other				
0000.01.05.00.00		Development				
	Finalize Specs.	Design Group	10dy	008	07-29-91	8:00a
0000.02.00.00.00		Development				
0000.02.01.00.00		Design				
	Select Eng. Team	Eng. Group	5dy	009	08-12-91	8:00a
	Buy Prod. Materials	Prod. Mater.	5dy	010	08-12-91	8:00a
	Build Prototype Model	Eng. Group	10dy	011	08-12-91	8:00a
0000.02.02.00.00		Sales				
0000.02.03.00.00		Development				
	Review Test Feedback	Eng. Group	5dy	015	09-23-91	8:00a

Entering Account Codes

You enter and create account levels on the Account Outline the same way you build task levels on the Task Outline.

You can enter Account Codes manually or use an Account Mask on the Project Details screen to generate codes automatically as you create, promote, and demote accounts. The default Account Mask is **11.22.33.44.5555.** Refer to the example earlier in this section. Chapter 6 of the *Reference Guide* explains how to enter a custom Account Mask.

Procedure: Follow these steps to build an account structure with appropriate assignments:

1. Select **V**iew,**A**ccount Outline to display the Account Outline.
2. Decide how you will structure the Account Outline.
3. Decide if you should use the default Account Mask to generate Account Codes, customize the Account Mask on the Project Details screen, or enter codes manually.
4. Highlight the first Account Code and press **F3** to create another, or select **E**dit,**C**reate.
5. Use **Alt–Shift–Right** and **Left Arrow**, or the Promote and Demote buttons on the Tool bar, to promote and demote Account Codes. You can enter an Account Name in the space to the right of each code.
6. Use **Alt–Shift-Up** and **Down Arrow** to move assignments above and below appropriate Account Codes. The column to the right of the Account Number can contain an alphanumeric name.

Defining Reports and Charts

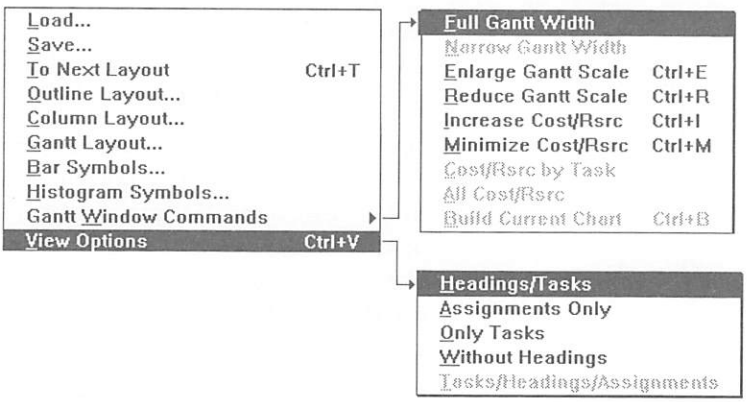
You have learned to produce reports and charts two ways, by selecting:

- File,Print View to print the current layout (Default, or one loaded with Layout,Load), or
- File,Print Reports to display a list of all available layouts for your selection.

Some prepared layouts are supplied with CA-SuperProject in REPORTS.SPJ. You can also create custom layouts following the guidelines in the next sections. Because each main View screen type has a different Layout menu, this chapter offers separate guidelines for creating Outline, PERT/Work Breakdown, and Details/Calendar layouts.

Guidelines for Outline Layouts

The Task Outline has this Layout menu; other outlines are similar:



You can use these options to create, save, and use fully-customized Outline layouts:

1. Display Outline data with an appropriate amount of detail. Hide and show levels to suit the purpose of your report or chart.

2. Select **L**ayout,**O**utline Layout to define the basic appearance of your chart or report, such as if certain levels of data display, how subtotals display, and how the columns are grouped for a crosstab report.

3. Select **L**ayout,**C**olumn Layout to control which columns display and their order from left to right.

4. If you want to sort assignment rows in a particular order, use the Sort column on the Column Layout dialog box to define sort keys. First, use **L**ayout,**V**iew Options to verify that the current view does not include headings.

5. If the Gantt column displays, select **L**ayout,**G**antt Layout to define the overall appearance of the Gantt column. Then, select **L**ayout,**B**ar Symbols to define Gantt bar colors and symbol patterns.

   To turn off the Gantt column, select **L**ayout,**O**utline Layout and be sure *Show Gantt* is not selected. You can also select **L**ayout,**C**olumn Layout to turn off the Gantt column.

6. You can display Cost/Resource Charts in the Gantt column of the Task, Resource, and Account Outlines. Use **L**ayout,**H**istogram Symbols to display the Cost/Resource Charts dialog box. Then, select *Show Graph* to display the chart, or click the Histogram button on the Tool bar. To display totals beneath the chart, check the box under *Total* for each field on the Cost/ Resource Charts dialog box.

   Use the other Cost/Resource Chart Options to define the chart's graph types, line and fill styles, and colors. You can use **L**ayout,Gantt **W**indow Commands, **I**ncrease Cost/Rsrc or **Ctrl–I** and **L**ayout,Gantt **W**indow Commands, **M**inimize Cost/Rsrc or **Ctrl–M** to increase and minimize its height, or use the Split bar object to adjust its height.

7. If you want to filter your output—perhaps limit it to certain tasks, resources, or dates—use **S**elect,Select **O**bject or **F7** to identify your selections, or define match and range criteria with **S**elect,Enter Criteria.

8. Save the finished layout for future use with **L**ayout,**S**ave.

9. Print the layout with **F**ile,**P**rint View or **F**ile,Print **R**eports.

The next sections tell more about each of these procedures.

Defining Detail Level

If you want to show data by hierarchical or structural levels, you will find it helpful to match the number of levels to the purpose of your report or chart.

Example: A summary report for upper management may have only two or three data levels:

Heading/Task	Task ID	Scheduled Start	Scheduled Finish
BIKER.PJ	P28	12-03-90> 8:00a	03-01-91 5:00p
Design	001	12-03-90 8:00a	12-14-90 5:00p
+ Build Market Profile	006	12-03-90 8:00a	12-07-90 5:00p
+ Analyze Competition	007	12-03-90 8:00a	12-07-90 5:00p
+ Finalize Specs.	008	12-03-90 8:00a	12-14-90 5:00p
Prototype	002	12-17-90 8:00a	12-28-90 5:00p
+ Select Eng. Team	009	12-17-90 8:00a	12-21-90 5:00p
+ Buy Prod. Materials	010	12-17-90 8:00a	12-21-90 5:00p
+ Build Prototype Model	011	12-17-90 8:00a	12-28-90 5:00p
Test	003	12-31-90 8:00a	01-25-91 5:00p
+ In-Plant Tests	013	12-31-90 8:00a	01-11-91 5:00p
+ Road Tests	014	01-14-91 8:00a	01-25-91 5:00p

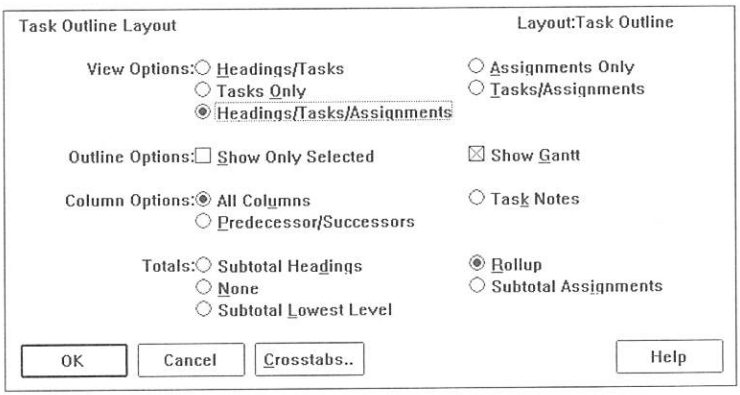
On the other hand, if you are preparing an activity list for supervisors you will want to include more detail, shown here on the Resource Outline:

Resource/Task	Schd Dur	Task ID	Scheduled Start	Scheduled Finish
Mkting Dept.				
Build Market Profile	5dy	006	12-03-90 8:00a	12-07-90 5:00p
Analyze Competition	5dy	007	12-03-90 8:00a	12-07-90 5:00p
Design Group				
Finalize Specs.	10dy	008	12-03-90 8:00a	12-14-90 5:00p
Eng. Group				
Select Eng. Team	5dy	009	12-17-90 8:00a	12-21-90 5:00p
Build Prototype Model	10dy	011	12-17-90 8:00a	12-28-90 5:00p
Review Test Feedback	5dy	015	01-28-91 8:00a	02-01-91 5:00p
Prod. Mater.				
Buy Prod. Materials	5dy	010	12-17-90 8:00a	12-21-90 5:00p
Expand Plant	15dy	019	02-04-91 8:00a	02-22-91 5:00p

Procedure: To reduce or "roll up" levels on the Task, Resource, and Account Outlines, highlight the target row and press the **Minus** (-) key on the numeric keypad or click the Hide button on the Tool bar. A **Plus** (+) key displays in front of rows with hidden levels. To show those levels again, highlight the row and press the + key or click the Show button on the Tool bar. See "Hiding and Showing Date Levels"earlier in this chapter for Date Outline hide/show instructions.

Defining the Basic Outline Layout

Select Layout,Outline Layout to define the most basic format of your Outline layout. The Outline Layout dialog box has these main option groups: View Options, Outline Options, Column Options, Totals, Crosstab By, Crosstab Fields. This chapter explains the highlights of each option. See Chapter 3 of the *Reference Guide* for a detailed description of each option.



View Options

On the Task Outline Layout dialog box, select ***Headings/Tasks/Assignments*** to show the structure of your data —phases, headings, and tasks in this case. Other Outline Layout dialog boxes have similar options— ***Headings/Resources/Assignments*** and ***Headings/Accounts/Assignments***. The other View Options show different parts of the structure; they are self-explanatory.

You can also select one of these View Options directly from the Layout menu with Layout,View Options or from the Tool bar.

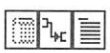
Outline Options

Show Only Selected displays only items highlighted with Select,Select Object or an active Select Criteria set. The filtered list displays only when the selected View Option (on the Outline Layout dialog box or from the Layout,View Options menu) does not include headings.

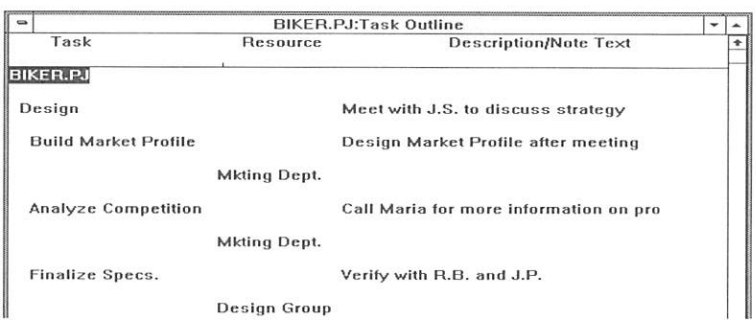
Show Gantt determines whether or not the Gantt column displays. You can select one, both, or neither Outline Option.

Column Options

There are three options for column display: All Columns, Predecessors/ Successors and Task Notes.

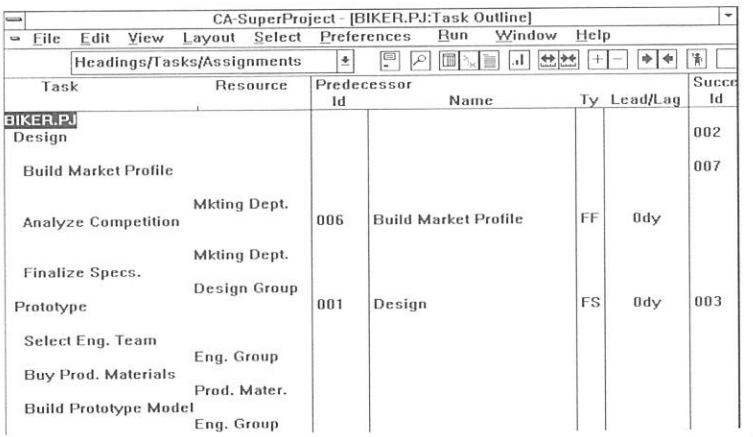


All Columns displays all data field columns defined by the Layout, Column Layout dialog box. ***Task Notes*** displays the Note Text field on the Task Outline:



See Chapter 6 of the *Reference Guide* for more on Note Text.

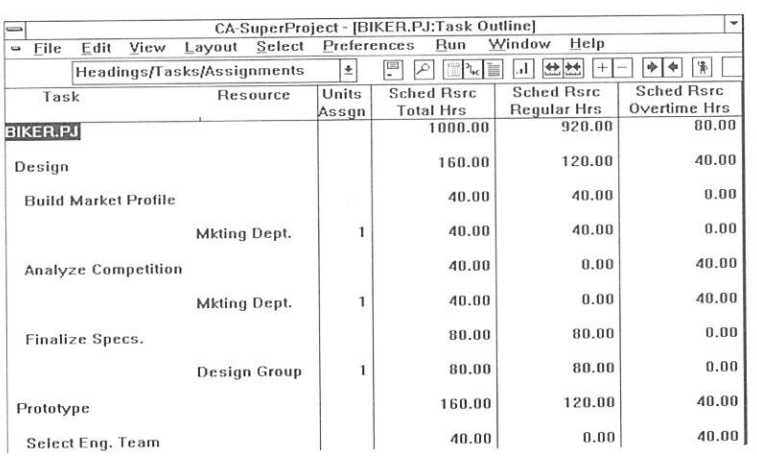
Predecessor/Successors displays linked tasks on the Task Outline:



Totals

Rollup shows totals on the same line as the heading to which they apply. ***Subtotal*** options show totals beneath all headings, assignments, or lowest-level items for each heading. These illustrations show examples of each Totals option:

Rollup



Subtotal Headings

CA-SuperProject - [BIKER.PJ:Task Outline]

File Edit View Layout Select Preferences Run Window Help

Headings/Tasks/Assignments

Task	Resource	Units Assgn	Sched Rsrc Total Hrs	Sched Rsrc Regular Hrs	Sched Rsrc Overtime Hrs
BIKER.PJ					
Design					
Build Market Profile					
	Mkting Dept.	1	40.00	40.00	0.00
Analyze Competition					
	Mkting Dept.	1	40.00	0.00	40.00
Finalize Specs.					
	Design Group	1	80.00	80.00	0.00
Subtotal Design			160.00	120.00	40.00

Subtotal Assignments

CA-SuperProject - [BIKER.PJ:Task Outline]

File Edit View Layout Select Preferences Run Window Help

Headings/Tasks/Assignments

Task	Resource	Units Assgn	Sched Rsrc Total Hrs	Sched Rsrc Regular Hrs	Sched Rsrc Overtime Hrs
BIKER.PJ					
Design					
Build Market Profile					
	Mkting Dept.	1	40.00	40.00	0.00
Subtotal Build Market Profile			40.00	40.00	0.00
Analyze Competition					
	Mkting Dept.	1	40.00	0.00	40.00
Subtotal Analyze Competition			40.00	0.00	40.00

Subtotal Lowest Level

CA-SuperProject - [BIKER.PJ:Task Outline]

File Edit View Layout Select Preferences Run Window Help

Headings/Tasks/Assignments

Task	Resource	Units Assgn	Sched Rsrc Total Hrs	Sched Rsrc Regular Hrs	Sched Rsrc Overtime Hrs
BIKER.PJ					
Design					
Build Market Profile					
	Mkting Dept.	1	40.00	40.00	0.00
Analyze Competition					
	Mkting Dept.	1	40.00	0.00	40.00
Finalize Specs.					
	Design Group	1	80.00	80.00	0.00
Subtotal Design			160.00	120.00	40.00

Crosstabs

CA-SuperProject's Crosstab feature lets you group up to four Crosstab fields beneath one of eight column-heading fields, selected from the ***Crosstab By*** options. To select the Crosstab fields, click the Crosstabs... button on the Outline Layout dialog box.

Task Outline Layout — Layout:Task Outline

View Options: ○ Headings/Tasks ○ Tasks Only ◉ Headings/Tasks/Assignments ○ Assignments Only ○ Tasks/Assignments

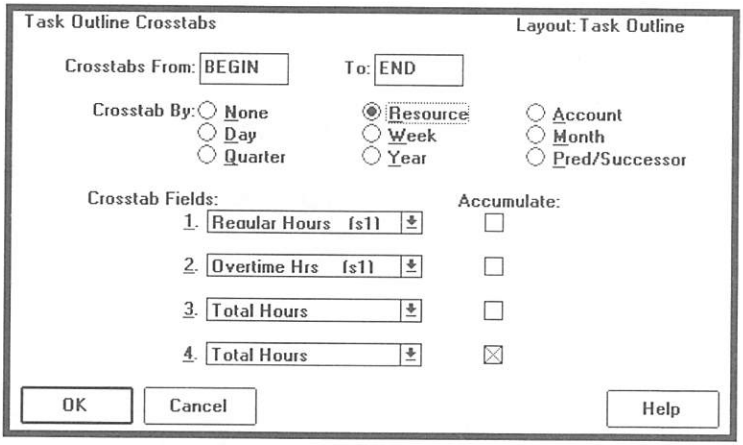
Outline Options: ☐ Show Only Selected ☒ Show Gantt

Column Options: ◉ All Columns ○ Predecessor/Successors ○ Task Notes

Totals: ○ Subtotal Headings ○ None ○ Subtotal Lowest Level ◉ Rollup ○ Subtotal Assignments

OK Cancel Crosstabs.. Help

As an example, this Outline Layout:



results in this Crosstab report:

BIKER.PJ:Task Outline

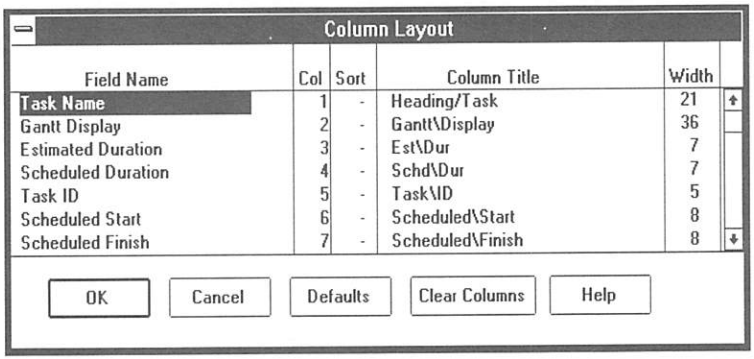
Task	Resource	Mkting Dept. Regular Hours	Overtime Hrs	Conflict Hrs
BIKER.PJ		40.00	0.00	40.00
Design		40.00	0.00	40.00
Build Market Profile		40.00	0.00	0.00
	Mkting Dept.	40.00	0.00	0.00
Analyze Competition		0.00	0.00	40.00
	Mkting Dept.	0.00	0.00	40.00
Finalize Specs.		0.00	0.00	0.00
	Design Group	0.00	0.00	0.00
Prototype		0.00	0.00	0.00
Select Eng. Team		0.00	0.00	0.00
	Eng. Group	0.00	0.00	0.00

Crosstab columns display after all the fields on the Column Layout. To show only Crosstabs, select **L**ayout,**C**olumn Layout and press the **minus** key (-) on the numeric keypad to delete the column order number for each unwanted column. For details see the next section, "Controlling Column Order."

If you select *Accumulate* for a Crosstab field, new values are added to the previous total for that field.

Controlling Column Order

To change the Outline column order, select Layout,Column Layout. The Column Layout dialog box displays:



Use **Up Arrow** and **Down Arrow** to scroll through the field names. When you reach the target field:

- Press **Right Arrow** (or click with the mouse) to highlight the column number and type a new number, *or*

- Press **Alt–Shift–Up Arrow** or **Alt–Shift–Down Arrow** to move the field name higher or lower on the list. As you move the field name, its column number changes to show the new list position.

With either method, to "turn off" a column so it no longer displays on the Outline screen, press **minus** (-) on the numeric keypad. Type any column number in place of the -, or press the **plus** key (+) to display it again.

The Column Layout dialog box has five separate columns. All of the columns except for Field Name can be edited to affect the screen display:

Field Name - Name of the CA-SuperProject field.

Col - Controls the order in which the fields display on the screen.

Sort - Controls the precedence order in which the fields are sorted.

Column Title - Lets you define your own title for the column.

Width - Lets you determine the width of the field.

Example: The default Column Layout arrangement, displayed in the previous illustration, looks like this on the Task Outline when scrolled beyond the Gantt column:

BIKER.PJ:Task Outline

Task	Resource	Est Dur	Schd Dur	Task ID	Scheduled Start
BIKER.PJ			72dy	P28	05-20-91> 8:00a
Design			10dy	001	05-20-91= 8:00a
Build Market Profile		5dy	5dy	006	05-20-91 8:00a
	Mkting Dept.		5dy	006	05-20-91 8:00a
Analyze Competition		5dy	5dy	007	05-20-91 8:00a
	Mkting Dept.		5dy	007	05-20-91 8:00a
Finalize Specs.		10dy	10dy	008	05-20-91 8:00a
	Design Group		10dy	008	05-20-91 8:00a
Prototype			10dy	002	06-03-91 8:00a
Select Eng. Team		5dy	5dy	009	06-03-91 8:00a
	Eng. Group		5dy	009	06-03-91 8:00a
Buy Prod. Materials		5dy	5dy	010	06-03-91 8:00a
	Prod. Mater.		5dy	010	06-03-91 8:00a
Build Prototype Model		10dy	10dy	011	06-03-91 8:00a
	Eng. Group		10dy	011	06-03-91 8:00a

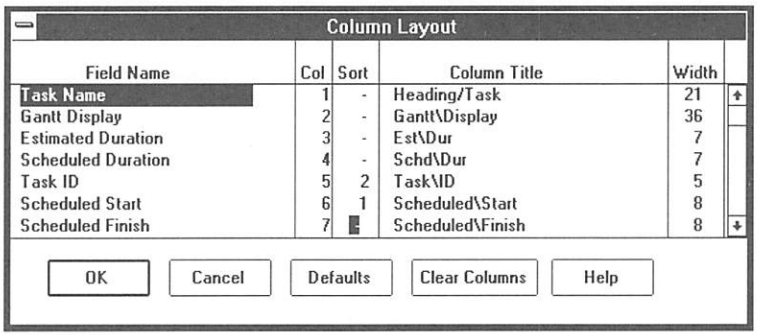
Sorting Outline Rows

Some information is presented best with a sorted chart or report. For example, you might want the Task Outline sorted by Scheduled Start, then Task ID. You control the sort fields and their order of importance by entering numbers in the Sort column of the Column Layout dialog box.

Procedure: To sort an Outline:

1. Choose **L**ayout,**O**utline Layout and verify that the View Option includes only tasks, resources, accounts, or assignments (no headings).
2. Use **L**ayout,**C**olumn Layout to display the Column Layout dialog box.
3. Enter a number from **1** to **3** next to the sort field or fields (enter **1** next to the field you want to sort by first). Enter a **minus** sign in front of the number if you want the field to be sorted in descending rather than ascending order.
4. Press **Enter** to sort the Outline.

Example: These Column Layout settings sort the Task Outline as it appears in the previous section, "Controlling Column Order."



If you add or edit information, use **S**elect,**S**ort Layout to re-sort the Outline.

Defining Basic Gantt Features

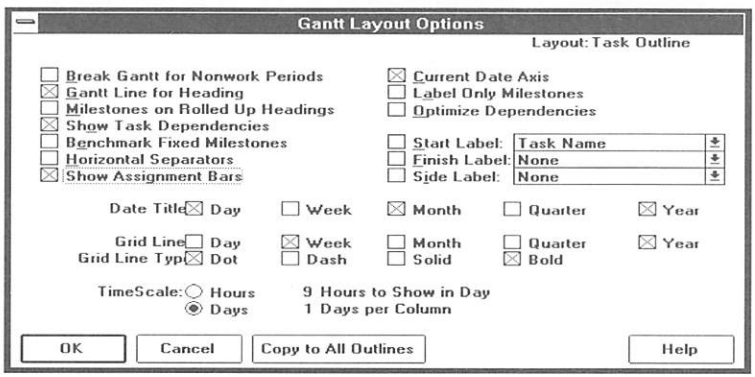
If *Show Gantt* is selected on the Outline Layout dialog box, you will see the Gantt column on the Task, Resource, and Account Outlines. You can control many features with quick keys and the Gantt Layout menu.

These quick keys and Tool bar buttons change the Cost/Resource Chart and timescale display while you are viewing the Gantt. Repeat each combination until the Cost/Resource Chart height and timescale suit you:

Key or Button	Effect
Crtl-E or Enlarge Button	Enlarges the timescale; fewer days per symbol until or, you reach Hour mode.
Ctrl-R or Reduce Button	Reduces the timescale; more days per symbol.
Ctrl-I or Split Bar Object	Increases Cost/Resource Chart height
Ctrl-M or Split Bar Object	Decreases Cost/Resource Chart height, if visible.
Ctrl-F	Displays a specified date on-screen.

Gantt Layout Options

To control other basic Gantt features, select Layout,Gantt Layout to display the Gantt Layout dialog box:



"Layout,Gantt Layout" in Chapter 3 of the *Reference Guide* explains each option if you need more detail than the help line includes. To highlight a few:

Current Date Axis displays the vertical line separating "past" and "future" activity.

Show Task Dependencies displays dependency link lines on the Gantt. This feature is helpful when you are linking tasks on the Task Outline.

Start, Finish, and ***Side Labels*** display the selected field value where indicated. Choose ***Label Only Milestones*** to show the label only for milestone tasks (with "0" duration).

Date Titles indicate the date intervals identified above the Gantt. You can select any or all of them. The default is Day, Month, Year.

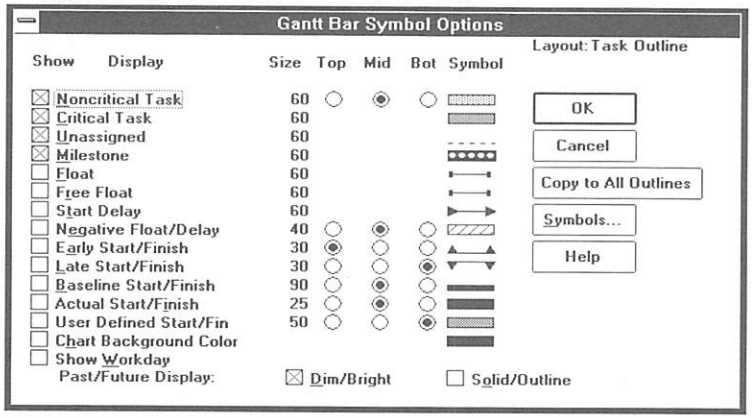
Grid Lines are vertical lines that mark each selected time interval. The default is Week and Year. Use ***Grid Line Types*** to control their appearance.

Show Assignment Bars display on the Gantt bar assignment to the right of the resource.

TimeScale determines whether the Gantt displays in Hour or Day mode. If you select ***Hours,*** indicate how many hours to show per day, from **1** to **24**; for ***Days,*** how many days (**1** to **999**) per column (or symbol).

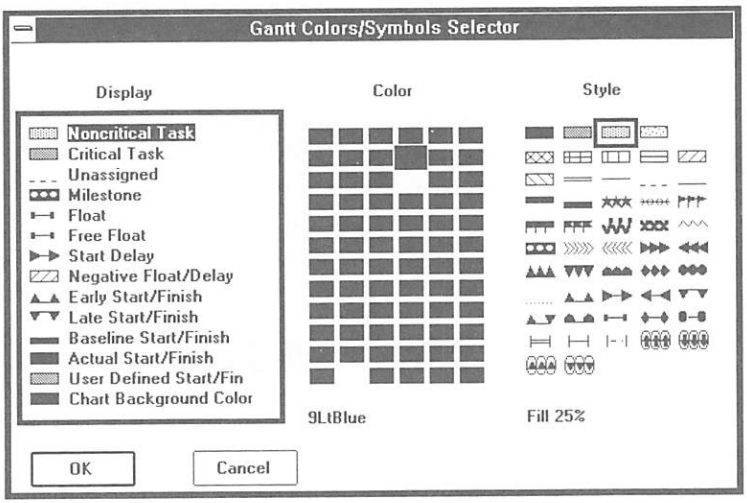
Defining Gantt Symbols

After you have set the overall appearance of the Gantt column, you can customize the Gantt bars. Start with the default layout, or load one of the prepared layouts supplied with CA-SuperProject. Use **Layout,Load** to display a selection list, or press **Ctrl–T** (for Layout,To Next Layout) to automatically load the next available layout. Then, select **Layout,Bar Symbols** to display the Gantt Symbol Options dialog box:



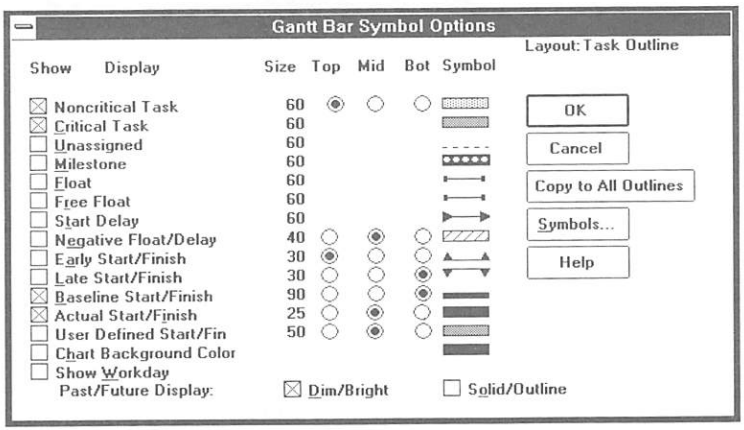
Procedure: To customize Gantt bars, follow these steps:

1. Select the fields to display on the Gantt.
2. Adjust symbol size relative to the current font size: 60 is the default (60% of the height of the current font); 50 is half the height and 200 is twice the font height. Size can range from 1 to 999. Gantt spacing adjusts to suit the selected size.
3. Select Top, Mid, or Bot to indicate whether the symbols for each field will display on the top, middle, or bottom line of each symbol area. The first eight fields display on the same line. The others can display on separate lines for comparisons.
4. Click the Symbols push button. CA-SuperProject displays the Symbol screen.

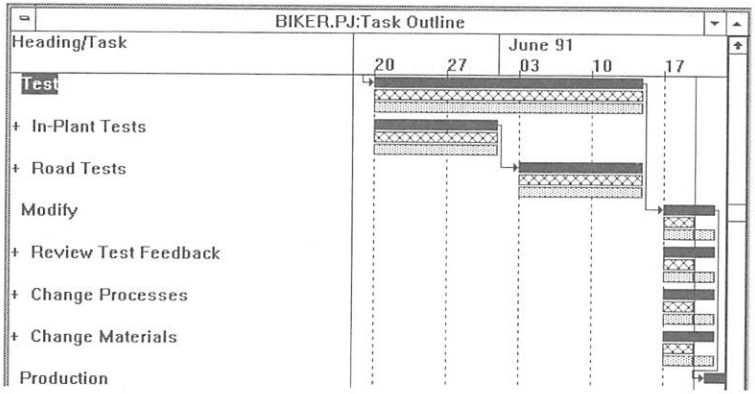


5. Select a fill pattern style and color for each symbol and the chart background.

6. For example, this layout setting:



displays Noncritical and Critical tasks on the top line of each area, Actual Start/Finish bars on the middle line, and Baseline Start/Finish bars on the bottom line:



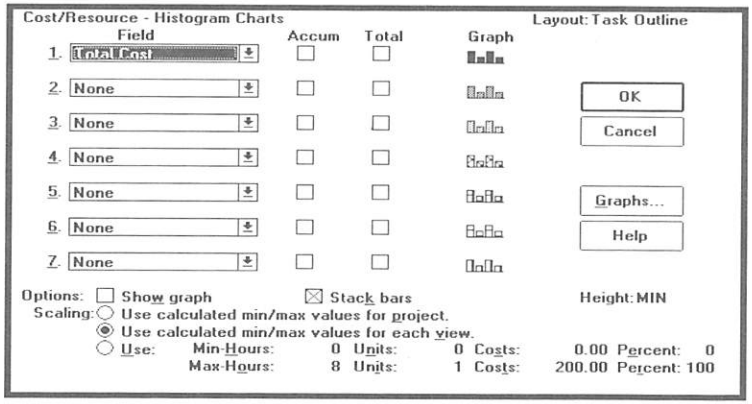
6. Select *Show Workday* if you want a dot to show for each scheduled workday that has no other symbol.

7. Indicate whether symbols to the left and right of the Current Date should be distinguished by dim and bright colors and/or solid and outlined symbols.

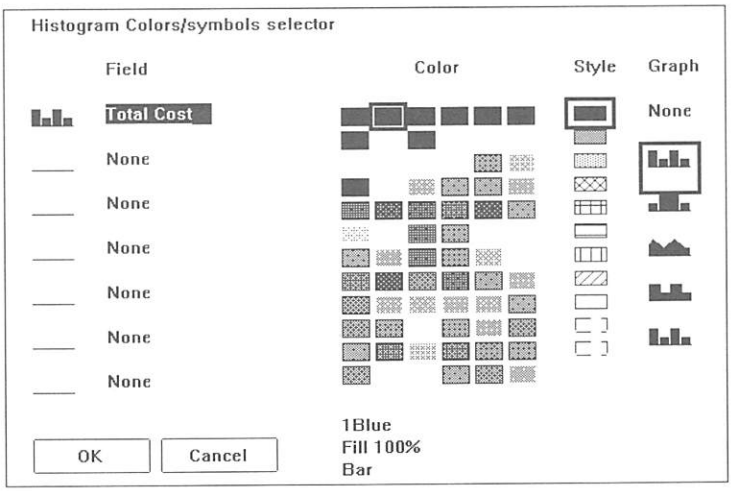
"Layout,Bar Symbols" in Chapter 3 of the *Reference Guide* contains details on each option.

Defining Cost/Resource Charts

To create or modify a Cost/Resource Chart on all but the Date Outline, select Layout,Histogram Symbols to display the Cost/Resource Charts dialog box:



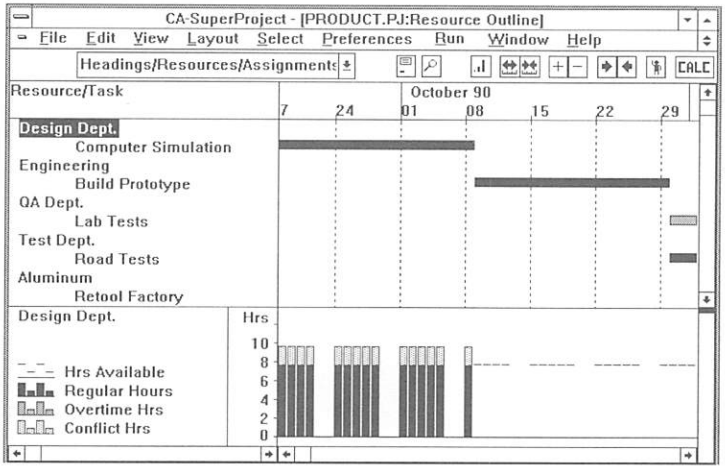
Define chart fields and symbols with its options. To select the graph colors/styles, click the Graphs push button. The Histogram/Colors/Symbols dialog appears.



When the chart is ready, choose *Show graph* and click **OK** to display it.

Use **Ctrl–I** to increase the chart's height, or **Ctrl–M** to minimize it. You can also increase or minimize its height with the Split bar object. You can also enter MIN, MAX, or a character height value in the *Height:* field.

The Cost/Resource Chart on the Resource Outline is often called a resource histogram because it shows regular, overtime, conflict, and available hours for the current resource as vertical bars:



To show a Cost/Resource Chart for another resource on the Resource Outline, point anywhere within that resource's row. Select **L**ayout,Gantt **W**indow Commands,**C**ost/Resource by Resource to automatically display a chart for each resource as you highlight it. Select **L**ayout,Gantt **W**indow Commands,**A**ll Cost/ Rsrc to paint the chart for each resource and assignment.

You can reduce the timescale with the Reduce Gantt Scale button and increase it with the Enlarge Gantt Scale button (**Ctrl–R** and **Ctrl–E**).

Changing the Cost/Resource Chart's Appearance

On the Task, Resource, or Account Outline, you can:

- Choose other graph formats besides Bar.
- Change the graph colors for each field.
- Include up to seven fields with optional totals.
- Stack cost and workload values or graph them separately.
- Show separate values for each time interval or accumulate values over time.

"Layout,Histogram Symbols" in Chapter 3 of the *Reference Guide* describes each option on the Cost/Resource Charts dialog box and tells how to set them to graph your data.

Filtering the Display

You've learned to use the numeric keypad + and – to hide and show levels within the Outline hierarchies; **Alt–Shift–Right Arrow** and **Alt–Shift–Left Arrow** show more and less detail on the Outlines. You can also click the Show and Hide buttons to show and hide tasks.

Procedure: You can also control row display with the Select menu:

1. Verify that the current Layout,View Options selection does not include headings.
2. Highlight each object (heading, task, resource, date, account, assignment) that you want to display and choose **S**elect,Select **O**bject, *or*

   Define and activate a Select Criteria set with **S**elect,Enter Criteria. For instructions, see "Select Menu" in Chapter 2 of the *Reference Guide*.
3. Select ***Show Only Selected*** on the Layout,Outline Layout dialog box.

Saving and Using Custom Layouts

Select **L**ayout,**S**ave to save the layout for future use. When the dialog box displays, enter a meaningful name so you will be able to identify the layout when you want to use it again.

Whenever you are viewing the same type of Outline screen, you can use **L**ayout, **L**oad to retrieve your customized layout. The screen format changes to match whatever Layout selections were active when you saved the layout.

After it is loaded, you can print your layout with File,**P**rint View. Or, select File,Print **R**eports to print the layout without loading it first.

Guidelines for PERT/WBS Layouts

You'll follow similar steps to customize PERT and Work Breakdown Chart layouts (see Chapter 4 of the *Reference Guide* for details):

1. Display Chart data with an appropriate amount of detail. Hide and show levels to suit the purpose of your report or chart, using the + and – keys on the numeric keypad.
2. For the Work Breakdown Chart, use **Ctrl–V** (for Layout,View Options) to cycle through several chart formats (Top Down, Sideways, Top Down Compact, Sideways Compact). You can also select these as options on the WBS Layout dialog box. Or, you can cycle through the chart formats by clicking the Top Down, Sideways, Top Down Compact, and Sideways Compact buttons on the Tool bar.
3. Select **L**ayout,**P**ERT Layout (or **L**ayout,**W**BS Layout) to define the basic operation and appearance of the display—whether it arranges the boxes after each edit, whether headings display, whether completed tasks are distinguished from scheduled and in-progress tasks, whether all tasks are shown or selected only. You also indicate box colors on this dialog box.

4. Select **L**ayout,**B**ox Styles to control border style and field contents of each box type (task, heading, milestone, subproject).
5. If you want to filter your output—perhaps limit it to certain tasks, resources, or dates—use **S**elect,Select **O**bject to identify your selections, or define match and range criteria with **S**elect,**E**nter Criteria. Chapter 2 of the *Reference Guide* tells more about creating and using Select Criteria sets.
6. Save the finished layout for future use with **L**ayout,**S**ave.
7. Print the layout with **F**ile,**P**rint View or **F**ile,Print **R**eports.

Guidelines for Details/Calendar Layouts

When you display a Project, Task, or Resource Details screen, you can follow these steps to change the screen's layout:

1. Click the format buttons on the Tool bar, or use **Ctrl–V**, to toggle among available view windows at the bottom of the screen; the top remains unchanged.
2. To adjust column order on the Task Details screen in Assignment view, first display the Task Outline. Select **L**ayout,**C**olumn Layout and follow the instructions given in "Controlling Column Order" earlier in this chapter. When you display the Task Details screen, its column order will be the same as the Task Outline; no Gantt will display.

   Resource Details column order is controlled in a similar way by current order on the Resource Outline.
3. Select **F**ile,**P**rint View to print using the current layout. When the Output dialog box displays, you can choose ***Selected Only*** to print Details Screens or Calendars for selected projects, tasks, or resources. If no items are selected, you will print all Details of the displayed type, not just the one currently displayed.
4. If you want to print some but not all Task or Resource Details screens, use **S**elect,Select **O**bject or define/load a Select Criteria set. See "Select Menu" in Chapter 2 of the *Reference Guide* for Select Criteria instructions.

5. If you know which Outline layout arranges the Details columns appropriately, you can enter that name in the File,Print Reports dialog box without going to the Outline screen and loading it first.

Calendars work the same way. Column order on the Project Calendar is set by the Task Outline order; Resource Calendar order is the same as the Resource Outline. When printing with File,Print View, you can enter a date range to control calendar length.

Introducing Earned Value Analysis

In 1967, the United States Department of Defense (DOD) published a set of Cost/Schedule Control System Criteria (C/SCSC), also known as C-Spec. These criteria define minimum ***Earned Value*** management control system requirements for DOD contractors.

Previous management control systems assumed a direct relationship between lapsed time, work performed, and incurred costs. The Earned Value system analyzes each of these components independently, comparing actual data to a baseline plan set at the beginning of a project.

Guidelines for Earned Value Analysis

If your project must comply with C-Spec requirements, CA-SuperProject lets you:

1. Create separate WBS and Account Masks so each task and accounting element (for example, department) has a unique number that identifies its hierarchical location within the project.
2. Set a project baseline for Earned Value comparisons.
3. Calculate up to 15 Earned Value fields.
4. Report these fields in columnar and graphic form.

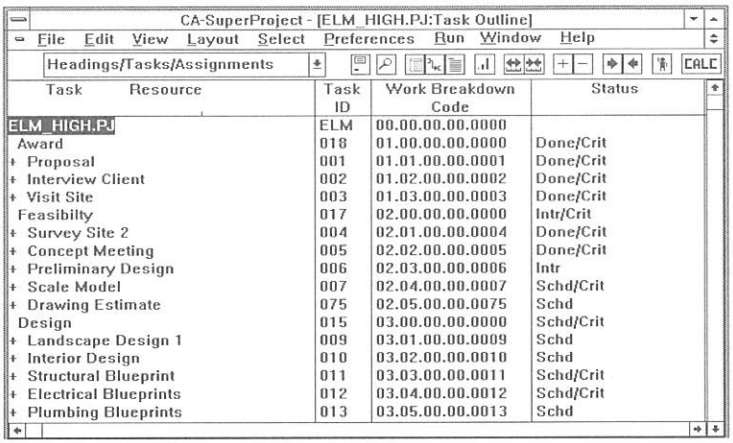
The next sections tell more about these steps.

WBS and Account Codes in Earned Value Analysis

Current C-Spec requirements specify separate Cost Performance Reports by work breakdown structure and organizational or functional category. After you have entered WBS and Account Codes manually or using a mask, you can use the Outline screens' Column Layout dialog box to sort Outline rows into the required report formats. See "Interpreting and Reporting Data" later in this chapter for more about Earned Value reporting.

Using WBS Codes

Many companies build their work breakdown structures around project task levels with the project itself as Level 1. For example, this Task Outline shows part of a project to remodel a manufacturing facility with revenues from on-going contracts.


CA-SuperProject - [ELM_HIGH.PJ:Task Outline]

File Edit View Layout Select Preferences Run Window Help

Headings/Tasks/Assignments CALC

Task Resource	Task ID	Work Breakdown Code	Status
ELM_HIGH.PJ	ELM	00.00.00.00.0000	
Award	018	01.00.00.00.0000	Done/Crit
+ Proposal	001	01.01.00.00.0001	Done/Crit
+ Interview Client	002	01.02.00.00.0002	Done/Crit
+ Visit Site	003	01.03.00.00.0003	Done/Crit
Feasibilty	017	02.00.00.00.0000	Intr/Crit
+ Survey Site 2	004	02.01.00.00.0004	Done/Crit
+ Concept Meeting	005	02.02.00.00.0005	Done/Crit
+ Preliminary Design	006	02.03.00.00.0006	Intr
+ Scale Model	007	02.04.00.00.0007	Schd/Crit
+ Drawing Estimate	075	02.05.00.00.0075	Schd
Design	015	03.00.00.00.0000	Schd/Crit
+ Landscape Design 1	009	03.01.00.00.0009	Schd
+ Interior Design	010	03.02.00.00.0010	Schd
+ Structural Blueprint	011	03.03.00.00.0011	Schd/Crit
+ Electrical Blueprints	012	03.04.00.00.0012	Schd/Crit
+ Plumbing Blueprints	013	03.05.00.00.0013	Schd

This example uses the default WBS Mask for determining WBS Code. You can enter your own mask format on the Project Details screen. See Chapter 6 of the *Reference Guide* for instructions.

Using Account Codes

Some C-Spec reports must be presented by organizational or functional category. If you do not need to show a unique number for each level (division, department, section, and so on), you can use the Resource Outline. If you require numbers, use the Account Outline arranged by department. See "Entering Account Codes" earlier in this chapter for details.

Earned Value Fields

Select **P**references,**E**xpert Modes,**E**arned Value Analysis to display the fields needed for Earned Value analysis and reporting. The Baseline fields also display.

Before you can use the Earned Value fields you need to set the project baseline. If you have not already set the baseline, see "Saving the Baseline" in Chapter 4 for instructions.

These Earned Value fields are available in CA-SuperProject:

Earned Value (BCWP)
Budgeted Cost of Work Scheduled (BCWS)
Schedule Variance
Cost Variance
Variance at Completion
Cost Variance Percent
Schedule Variance Percent
Cost Performance Index Percent
Calculated Estimate at Completion (EAC)
Scheduled Performance Index Percent
Actual Performance Index Percent
Actual Duration/Baseline Duration as Percent
Remaining Duration/Baseline Duration as Percent

These fields display for headings, tasks, and assignments. Chapter 7 of the *Reference Guide* contains definitions of each field. The most used fields are:

Earned Value (BCWP)

Also called the Budgeted Cost of Work Performed. BCWP is calculated as (Baseline Total Cost × Percent Complete) ÷ 100 for Prorate Accrual method types, or the Baseline Total Cost at the Start or End of the assignment for Start or End Accrual method types.

Budgeted Cost of Work Scheduled (BCWS)

Also called Planned Cost. BCWS is calculated as (Baseline Duration to the current date ÷ total Baseline Duration) × Baseline Total Cost for Prorate Accrual Method types. For Start/End Accrual Method types, it is the Baseline Total Cost at the Start or Finish of the assignment.

Schedule Variance BCWP – BCWS.

Cost Variance BCWP–Actual Cost of Work Performed (ACWP).

Variance at Completion Baseline Total Cost–Scheduled Total Cost.

Interpreting and Reporting Data

Although Earned Value analysis is required of government contractors, other project managers can benefit from it. You receive an objective calculation of project status at the assignment, task, and heading levels. For example, you can compare Percent Complete data for all tasks beneath a heading and look for tasks that are progressing slower than the others. In the same way, you can see if one or two assignments are falling behind and delaying a task.

The Variance fields help predict the amount that final dates and costs will differ from your original plans. Through "what-if" analysis, you can estimate how much corrective action (time and cost cutting) is necessary to bring the project back on track.

You can prepare columnar reports and graphic charts to help with Earned Value analysis.

Preparing Columnar Reports

If you are a government contractor, you must submit Earned Value status reports on a regular basis. Most are based on the Task Outline, but you may need the Resource, Account, or Date Outline as well. Use the Outline Layout dialog box to set appropriate Outline, View, and Totals Options. You will find the Crosstabs feature helpful for many reports. Remember, you can accumulate totals—from one quarter to the next, for example—or use straight totals. After you have set up the basic layout, use the Column Layout dialog box to arrange a suitable column order. If you are using Crosstabs, you may need to delete columns between identification fields in the first several columns and the start of Crosstabs columns at the right edge of the layout.

See "Guidelines for Outline Layouts" earlier in this chapter for other editing suggestions and details.

Preparing Graphic Charts

While C-Spec does not require Earned Value charts, they can be effective for status presentations. Use any of the layouts listed in the Columnar Report section. Then, follow the chart customizing suggestions given earlier in this chapter in "Defining Cost/Resource Charts" to display the Cost/Resource Chart on the Task, Resource, or Account Outline.

Appendix A
Calculation Error Messages

This section contains a list of Calculation Diagnostic error messages and the appropriate corrective actions to take when they display. Under the **Message:** heading is the word-for-word error message. This is followed by the **What to do:** heading, which describes one or more steps to solve the conflict.

Message: Conflict on <*taskname*>, Actual Start is earlier than Project Start. Project Start set to task Actual Start.

What to do: Check to make sure that your actual dates were entered correctly. If the dates were entered correctly, ignore this message.

Message: Actual Date greater than the ***Current Date*** on task <*taskname*>. Actual Date will be ignored.

What to do: This message should only occur if the ***Current Date*** field in the Preferences, Calculation Options dialog box was changed. CA-SuperProject does not allow Actuals to have a future date. Verify the ***Current Date*** and the Actuals on the task, or move the Current Date forward to a date ahead of all the Actual dates.

Message: Conflict on <*taskname*>, Must Start is earlier than Project Start. Set Project Start to Must Start?

What to do: YES sets the Project Start to the Must Start date on that task; NO will not change the Must Start of the project, although this will generate other error messages relating to the Early Start of the task and its Must Start.

To remove the warnings, change the Must Date on the task, or change the Project Start date. This only occurs when scheduling the project from the start of the project (as opposed to using a Project Target Finish date).

Message: Conflict on <*taskname*>, Must Finish is later than Project Finish. Set Project Finish to Must Finish?

What to do: YES sets the Project Finish to the Must Finish date on that task; NO will not change the Must Start of the project, although this will generate other error messages relating to the Late Start of the task and its Must Start.

To remove the warnings, change the Must Date on the task, or change the Project Finish date. This only occurs when scheduling the project from the end of the project (using a Target Finish date).

Message: Disconnecting subproject from task <*taskname*>.

What to do: This message occurs during calculation when the user is updating subprojects and a subproject cannot be found. This is a warning that the task cannot be a connect task and will be changed back into a normal task.

Message: Must dates on task <*taskname*> ignored; subproject is frozen.

What to do: This message occurs if a subproject is "frozen" (using the *Freeze* flag on the Project Detail screen) and the connect task has a Must date that conflicts with the current Start date of the subproject. Either unfreeze the subproject or remove the Must date in the connect task.

Message: Subproject <*subname*> has a Must Start or Finish date that will be deleted.

What to do: This message usually occurs when a subproject that contains a Must date is first connected and updated. CA-SuperProject does not recognize project "Must" dates and removes them during the calculation process if found. To lock in the Start or Finish of a subproject, enter Must dates into the connect task.

Message: Subproject connection error with project <*projname*>; possible circular subprojects.

What to do: Verify that all subprojects are properly connected. They must not be connected in a "circular" fashion. For example, you may not connect SubA to SubB, SubB to SubC, and SubC to SubA.

Message: Leveling error – unable to resolve all conflicts for resource <*resname*>.

What to do: This message is caused when CA-SuperProject is unable to resolve resource conflicts during leveling, usually due to multiple assignments on tasks that have individual priorities and constraints. One option that may help (if it is not already active) is ***Allow Staggered Assignments*** on the Calculation Options dialog box. "Split Resource Assignments" may also help.

If the error still occurs, try keeping priorities of assignments on a given task the same, or reducing the number of assignments per task. Also, check to make sure that the Resource Calendars and Workweeks will allow the resources to work when needed.

Message: Must date forcing Scheduled Start before Early Start on <*taskname*>. Scheduled Start used and Early Start (based on precedence) is ignored.

What to do: This message is caused when precedence links try to push a task beyond user-defined Must constraints. The Must constraints will be honored. The result is that Negative Delay will be generated on the task with the Must Date and many or all predecessors will get Negative Float. To remove the Negative Float and delay, either remove the precedence links or remove the Must constraint.

Message: Feeding back ***Current Date*** caused Must date to be ignored on task <*taskname*>.

What to do: This message results when tasks have Must constraints that have been violated by the ***Feedback Current Date*** option.

Make sure that Actuals have been properly entered for your project. When ***Feedback Current Date*** is active, all tasks *that do not have an Actual Start will be moved forward to the* ***Current Date*** or beyond.

Message: Actual Start before Early Start on <*taskname*>. Actual Start used and Early Start (based on precedence) is ignored.

What to do: This is a warning that an Actual Start has been entered before the earliest start determined by precedence links or the Project Start. Verify that the Actual Start has been entered correctly. If it has, either remove precedence links to this task or ignore the message.

Message: Conflict between task Must date and assignment Must date on task <*taskname*>.

What to do: This occurs when an assignment and its task both have Must dates that are in conflict (for instance, an assignment Must Start On date that is after an assignment Must Start On). Examine the Must dates and determine which are correct.

Message: Must date forcing Scheduled Finish after Late Finish on <*taskname*>. Scheduled Finish used and Late Finish (based on precedence) is ignored.

What to do: This occurs when a Must date forces a task to finish beyond its Late Finish. This could be due to a conflict in Must dates between tasks, or a conflict between the Project Finish date when using the Project Finish as a Target Finish date. Examine Must conditions to resolve the conflict.

Message: Actual Finish after Late Finish on <*taskname*>. Actual Finish used and Late Finish (based on precedence) is ignored.

What to do: This message occurs when calculating towards a Target Project Finish date, and an Actual Finish was entered that conflicts with the Late Finish determined by precedence links. Examine the precedence links, Actual Dates and Must conditions within the project to insure all are correct.

Message: Leveling Aborted. Not enough material <*resname*> to finish project.

What to do: Check material allocations. The total amount of materials "produced" (using material allocations bp, ep, hp, dp) must be equal to or greater than the total amount of material "used" before that material may be leveled. To resolve, either produce more materials or turn leveling off for this material (using the *Level* checkbox on the Resource Detail view).

Message: Must dates on connected task <*subname*> ignored; cannot mix calculation direction.

What to do: This occurs when a Must condition on a subproject connect task exists that causes a logical conflict with the project calculation direction (determined by an entered Project Start or Project Finish). For example, a conflict exists when a connect task has a Must Finish and the Project Start was entered.

Message: Resource <*resname*> has insufficient work hours in its calendar for scheduling. Calculation will be aborted.

What to do: This occurs when a resource is scheduled to work and it is unable to do so because of Calendar and Workweek constraints. Examine Calendar Holidays and Exceptions, and the Workweek (on the Resource Detail View) to make sure enough time is available for the resource to work.

Appendix B
Glossary

UG=User Guide, RG=Reference Guide

Account Code (Acct)
A user-defined account number for the task or assignment (Chapter 6 *UG*, 3 and 7 *RG*).

Account Name
An optional text name for the account (Chapter 7 *RG*).

Account Mask
A template on the Project Details, similar to the WBS Mask, that lets you define the format of account codes (Chapter 6 *UG*, 6 and 7 *RG*).

Account Outline
A screen that lists the project's activities in outline format, organized by account number (Chapter 6 *UG*, 3 *RG*).

Accrual Method
The way the assignment accrues costs, which can be either Start, Prorate, or End (Chapter 6 *UG*, 7 *RG*).

Actual Cost (Act)
The total actual costs incurred for project, task, resource, or assignment activity; also called ACWP, or Actual Costs of Work Performed (Chapter 7 *UG*, 7 *RG*).

Actual Duration (Actual Dur)
The time span of the completed project, task, or assignment (Chapter 7 *UG*, 7 *RG*).

Actual Duration/Baseline Duration as percent
(Actual Resource Total Hours × 100) ÷ Baseline Resource Total Hours (Chapter 7 *RG*).

Actual Finish
The date a project, task, or assignment actually finished (Chapter 7 *UG*, 7 *RG*).

Actual Performance Index Percent (API)
(Actual Cost of Work Performed (ACWP) × 100) ÷ Budgeted Cost of Work Scheduled (BCWS) (Chapter 7 *RG*).

Actual Resource Total Hours (Actl)
The total resource hours spent for the assignment, task, resource, account, or the project as a whole—may also display in minutes, days, weeks, months, and years (Chapter 7 *UG*, 7 *RG*).

Actual Start
The date a task actually started (Chapter 7 *UG*, 7 *RG*).

ACWP
The Actual Cost of Work Performed; the Total Actual Cost (Chapter 7 *RG*).

Advanced Planning fields
Expert mode fields for refining project plans (Chapter 6 *UG*, 2 *RG*).

ALAP
As Late As Possible scheduling. Uses available float to schedule a task to start at the latest possible time without delaying the project. This option may save interest expense, delay material purchase, or expedite other tasks or projects (Chapter 6 *UG*, 7 *RG*).

Allocation per Day
The amount of time a resource is assigned to a task each day. You can assign a resource to work n hours each day or n% of each day until all the Scheduled Resource Total Hours are used up (Chapter 5 and 6 *UG*, 7 *RG*).

Arrow keys
Four keys—Up, Down, Left, and Right Arrows—you can use alone or with other keys to move the cursor, position items, and scroll through the windows (Chapter 3 *UG*, 1 *RG*).

ASAP
As Soon As Possible scheduling. A Task Type that schedules a task to start as soon as it can (Chapter 6 *UG*, 7 *RG*).

Assignment
A record describing the work a resource performs on a task, including associated costs. All project costs originate with assignments, including all resource costs, rates, fixed costs, and time allocations. (Chapter 1 *UG*, 1 and 3 *RG*).

Assist mode
A Help mode that provides pop-up help for each field and menu item. You can toggle this mode with Help,Assist Mode from the menu (Chapter 3 *UG*, 2 *RG*).

Author
The person entering data when building and updating a project (Chapter 7 *RG*).

Auto Actuals
A Preferences,Calculation Options setting from the menu. When Auto Actuals is selected, CA-SuperProject assumes that tasks and assignments started and finished on their Scheduled dates, and automatically records an Actual Start/Finish for each Scheduled date that has passed (Chapter 7 *UG*, 2 *RG*).

Auto Calculation
A Preferences,Calculation Options setting from the menu that determines whether the program automatically calculates the project after each edit.

To have the program calculate the schedule after each change, select Auto Calculation. If Auto Calculation is not selected, use the CALC tool bar button, File,Calculate from the menu, F9, or an exclamation mark (!) to update the schedule (Chapter 5 *UG*, 2 and 7 *RG*).

Auto Put Away
A Preferences,General Options setting from the menu that determines whether the program automatically saves the current project to disk and clears it from memory each time you load a new project (Chapter 2 *RG*).

Available Work Hours
The total resource hours available for work, including overtime, between the current date and the Project Scheduled Finish. Displays only on the Cost/Resource Graphs (Chapter 7 *RG*).

BAC
Budget at Completion; the Baseline Total Cost (Chapter 7 *RG*).

Backup
The process of duplicating a file to protect against possible data loss.

Bar Symbols
A Layout option that determines which fields display and how they look on the Gantt portion of the Outlines (Chapter 6 *UG*, 2 *RG*).

Baseline
The set of planned dates, resource total hours, and costs for each task in a project, saved for comparison with current or actual schedules. (Chapter 4 and 5 *UG*, 3, 6, and 7 *RG*).

Baseline Compare fields
A set of Expert mode fields, including planned start and finish dates, durations, and costs, saved to a baseline for comparison with current project activity (Chapter 4 *UG*, 2 and 7 *RG*).

Baseline Duration
The difference between Baseline Start and Finish; the Scheduled Duration set as the baseline (Chapter 4 and 5 *UG*, 7 *RG*).

Baseline Resource Total Hours
The Scheduled Resource Total Hours set as the baseline (Chapter 4 and 5 *UG*, 7 *RG*).

Baseline Start/Finish
The Scheduled Start and Finish set as the baseline (Chapters 4 and 5 *UG*, 2 and 7 *RG*).

Baseline Total Cost
Baseline Variable Cost + Baseline Fixed Costs; also called BAC or Budget at Completion (Chapter 4 and 5 *UG*, 7 *RG*).

BCWP (Earned Value)
The Budgeted Cost of Work Performed; the Baseline Total Cost at the start or end of the assignment, task, or project if Accrual Method is Start or End, or the Baseline Total Cost (BAC) × Percent Complete ÷ 100 if Accrual Method is Prorate (Chapter 6 *UG*, 7 *RG*).

BCWS (Baseline Costs to Date)
Budgeted Costs of Work Scheduled; the Baseline Total Cost at the start or end of the assignment, task, or project if Accrual Method is Start or End, or the Baseline Total Cost × (baseline duration to the current date ÷ total Baseline Duration) if Accrual Method is Prorate (Chapter 6 *UG*, 7 *RG*).

Borders
Lines that separate sections of the screen and reports or that surround chart boxes (Chapter 6 *UG*, 2 *RG*).

Box Styles
A Layout dialog box that defines the content and border styles for PERT Chart and Work Breakdown Chart boxes (Chapter 6 *UG*, 2 *RG*).

Build Subproject
A command from the File,Subprojects menu that creates a subproject from selected tasks, removing them from the current project and saving them under a new name (Chapter 2 *RG*).

Calculated EAC
The calculated Estimate at Completion. The scheduled Total Cost, which the program calculates as (Baseline Total Cost (BAC) × 100) ÷ Cost Performance Index (CPI) (Chapter 6 *UG*, 7 *RG*).

Calculation
The computation of a project to reflect entered changes. With Auto Calculation selected on the Preferences,Calculation Options screen, the program calculates after each revision. With Auto Calculation not selected, it only calculates when you use the **CALC** tool bar button, File,Calculate from the menu, F9, or the exclamation mark (!) (Chapter 5 *UG*, 2 *RG*).

Calculation Diagnostics
A Preferences,Calculation Options setting from the menu that determines whether CA-SuperProject displays messages about schedule and resource conflicts (Chapter 5 *UG*, 2 *RG*).

Calculation Options
Preference settings that control advanced scheduling features for CA-SuperProject. This dialog box is displayed with Preferences,Calculation Options from the menu (Chapter 5 *UG*, 2 *RG*).

Calendar
A date display indicating holidays and workload. Each project has a Project Calendar, indicating project-wide holidays, and each resource has a Resource Calendar, indicating individual nonworkdays and exemption days (Chapter 5 *UG*, 5 *RG*).

Check box
A small box associated with an option in a dialog box. The option is selected when there is an X in the check box. Click in a check box or press **Spacebar** to select or unselect the option (Chapter 3 *UG*, 1 *RG*).

Click
To position the mouse pointer on an object, then press and release the mouse button without moving the mouse.

Close
To put a project or file away by selecting the File,Exit command from the menu, the Close command on the Control menu, or by clicking the close box on the left side of the window's title box (Chapter 3 *UG*, 1 and 2 *RG*).

Command
An instruction that causes an action to be performed. A command can be typed from a keyboard, selected from a menu, invoked by using command keys, or embedded in a program.

Command keys
Keys or key combinations you can press instead of making menu selections. For example, F3 for the Edit,Create command (Chapter 1 and 2 *RG*).

Conflict
A time when a resource is overscheduled (the daily workload exceeds the workday limit plus available overtime hours) (Chapter 5 and 7 *UG*, 7 *RG*). ***See also*** Resource Conflict Hours.

Conflict Hours
See Resource Conflict Hours.

Connected task
A task in a project that represents a subproject and its duration. You can control appearance of connected tasks on the PERT Chart with Layout,Box Styles from the menu (Chapter 6 *UG*, 2 and 4 *RG*). ***See also*** Subproject.

Control menu
The menu that appears in every Windows application and in some standard applications. Objects and some dialog boxes also have a Control menu. Control menu commands in Windows applications are usually used to move and change the size of windows, or to close windows.

Control menu box
The small box located on the far left side of a window's title bar. When you click this box, the Control menu is displayed.

Costing
The way the program distributes task or assignment costs over time as seen on the day, week, month and year crosstab reports. A cost can be fixed (a one-time charge) or variable (such as hourly wages). The Show Cost Fields option on the **P**references,**G**eneral Options dialog box determines whether costing fields display (Chapter 6 *UG*, 7 *RG*).

Cost Performance Index Percent (CPI)
The Budgeted Cost of Work Performed (BCWP) × 100 ÷ Actual Cost of Work Performed (ACWP) (Chapter 7 *RG*).

Cost/Resource Chart
A graph that shows frequency vs. time. The names "Cost/Resource Chart" and "Histogram" are used interchangeably in CA-SuperProject. This chart appears on the lower portion of the Gantt column on the Outlines. To display this graph, select Show graph on the **L**ayout,**H**istogram Symbols dialog box from the menu. You can also expand and reduce this chart horizontally and vertically with Layout options (Chapter 7 and 8 *UG*, 3 *RG*).

Cost Variance
The Budgeted Costs of Work Performed (BCWP) – the Actual Cost of Work Performed (ACWP) (Chapter 6 *UG*, 7 *RG*).

Cost Variance Percent
(Cost Variance × 100) ÷ BCWP (Chapter 7 *RG*).

Created
The operating system date of the project's creation, displayed on the Project Details (Chapter 7 *RG*).

Crash
To shorten the project's schedule by using overtime, regardless of cost. The Calculation Options dialog box has three choices for using overtime: *Select None* for no overtime, *Select All* to schedule maximum overtime for every resource, and *Assignments w/Priority Over:_*, which allows overtime for assignments with priority over a certain number.

Critical path
The longest path through a sequence of tasks from the Project Scheduled Start to Scheduled Finish. The critical path determines the project duration, so any delay of critical tasks may delay the project. CA-SuperProject graphically distinguishes critical tasks and links from noncritical ones on the PERT and WBS Charts (Chapter 5 *UG*, 4 *RG*).

Critical task
A task with no float time, which delays the project finish if it is late (Chapter 5 *UG*, 4 *RG*).

Crosstabs
The increments or units (usually time or data type) by which fields are grouped in reports. With Outline Layout options, you can group columns by Resource, Account, Day, Week, Month, Quarter, Year, or Predecessor/Successor (Chapter 6 *UG*, 3 *RG*).

Current
The active record or item you can edit. A task, project, or resource becomes current when you highlight it with the cursor.

Current Units
See Units Assigned.

C/SCSC
Cost/Schedule Control System Criteria. A set of criteria specified by the Federal Government for contractors for NASA, the Department of Defense, and the Department of Energy. Also referred to as C–Spec fields, these specifications govern the ability to audit, control, and secure contract management systems. In CA-SuperProject these fields are called Earned Value Analysis fields, and you can display them with **Preferences,Expert Modes,Earned Value Analysis** from the menu (Chapter 6 *UG*, 7 *RG*). See also Earned Value Analysis fields.

C–Spec
See C/SCSC.

Daily Allocation
See Allocation per Day.

Date & International Format
Preference options that control date, time, and currency display formats. This dialog box displays with Preferences,Date & International Format from the menu (Chapter 2 *RG*).

Date Outline
A screen that shows a list of your project's activities in outline format and date arrangement (Chapter 6 *UG*, 3 *RG*).

Date Separator
A character the program uses to separate the three parts of a date—for example, the slash (/) in 10/12/91. The Date & International Format Preferences setting offers six choices for the date separator (/ . , – blank ;) (Chapter 2 *RG*).

Deadline
See Must Start or Must Finish.

Default Holidays
Project nonworkdays which you can create, save, and load onto other projects (Chapter 5 *UG*, 5 *RG*).

Defaults
The settings the program assumes when creating new data records. You can change the default for the current record, if necessary (Chapters 4 and 5 *RG*).

Delete
To remove a record, project, or field entry (Chapter 3 *UG*, 1 and 2 *RG*).

Demote
To move a task or heading down one level in the project structure (Chapter 5 *UG*, 4 *RG*).

Dependency
The relationship between tasks in a project as defined by links. For example, with a Finish-to-Start link, the second task's start depends on the first task's finish. With a Start-to-Start link, one task's start depends on another task's start. With a Finish-to-Finish, one task's finish depends on another task's finish (Chapter 5 *UG*, 4 *RG*).

Descendant
The tasks beneath or enclosed in a given heading (Chapter 5 *UG*, 4 *RG*).

Deselect
To turn off an option by clicking on it or using Select,Unselect from the menu.

Deviation (Dev)
The amount of uncertainty in the task's duration, also called Standard Deviation (Chapter 5 *UG*, 7 *RG*).

Dialog box
A screen box that prompts you to insert information, press a key, or otherwise interact (Chapter 3 *UG*, 1 *RG*).

Dimmed
Describes words or objects that appear light or outlined on the screen. For example, menu commands appear dimmed when they are unavailable (Chapter 2 *UG*). *See also* Highlight.

Directory
(1) On the Project Details screen, the disk drive (and path if appropriate) where you store a file; (2) in the operating system, an index of files (Chapter 7 *RG*).

Disk
A magnetically coated storage medium for data and programs. Disks can be flexible (floppy diskettes) or rigid (fixed or hard disks).

Diskette
See Disk.

Double click
Two mouse clicks in quick succession, interpreted as a single command. The action of a double click differs from that of a single click. For example, clicking on an object selects that object; double-clicking an object, opens it.

Drag
To position the mouse pointer on an object, press and hold the mouse button, move the mouse, and release the mouse button. When you release the mouse button, you either confirm a selection, size a window, or move an object.

Duration (Dur)
The length of the task, heading, or project in minutes (mn), hours (hr), days (dy), weeks (wk), months (mo), or years (yr).

You can enter an Estimated Duration for tasks, but you cannot edit the Estimated Duration for projects and headings. The program calculates the Scheduled Duration as the difference, in workdays, between the Scheduled Start and Finish, which is determined from the Estimated Duration, Actual Duration, and Resource Work.

You can also display probability durations (Optimistic, Pessimistic, and Likely), which are based on the Standard Deviation (Chapter 4 and 5 *UG*, 7 *RG*).

Early Finish
The earliest time a task can finish, which is the Scheduled Finish of the longest assignment. If the task has no assignments, CA-SuperProject adds the Scheduled Duration to the Early Start to determine the Early Finish (Chapter 7 *RG*).

Early Start
The earliest time a task can start, which is the Project Start if it is the first task in the project; otherwise, it is the latest of its predecessor's Early Finish dates (Chapter 7 *RG*).

Earned Value
See BCWP.

Earned Value Analysis fields
Expert mode fields, including Budgeted Costs of Work Performed (BCWP), Budgeted Costs of Work Scheduled (BCWS), and other fields required for government contractors. These fields add on to all other field groups (Chapter 6 *UG*, 2 and 7 *RG*).

Edit
To change the contents of a field (Chapter 3 *UG*, 2 *RG*).

Effort Driven
A Duration Option that causes Scheduled Resource Total Hours to drive the schedule. When this option is selected, you can reduce the duration of the task and assignments by adding more resources or you can lengthen the duration by subtracting resources. The task completes when all the Scheduled Resource Total Hours are used up, regardless of the Scheduled Duration (Chapter 6 *UG*, 7 *RG*).

Estimate at Completion
See Calculated EAC.

Estimated Duration
An estimate of how long a task should take to finish, which you can enter in minutes (mn), hours (hr), days (dy), weeks (wk), months (mo), or years (yr) (Chapter 4 *UG*, 7 *RG*). ***See also*** Duration.

Exception day
A day that gives exception to a resource's scheduled hours. To create an exception day, enter a holiday, a nonworkday, or the number of available work hours for the resource in one of the Resource Calendar date boxes (Chapter 5 *UG*, 5 *RG*).

Execute
To activate a command, usually by pressing Enter.

Expanded memory
Memory beyond the usual 640K that DOS makes available to applications. To use expanded memory, you must install an extended or expanded memory board and special software in your computer.

Export/Import
A File option that lets you exchange project data between the CA-SuperProject file format and other file formats (Chapter 2 and 8 *RG*).

Extended memory
Memory beyond the usual 1 megabyte limit of most IBM PC and compatible computers.

Factor
See Resource Efficiency Factor.

Feedback Current Date
A setting on the Preferences,Calculation Options dialog box that delays the Scheduled Start to the Current Date or later for all incomplete tasks, ignoring previous start dates (Chapter 2 *RG*).

Field
An area on the screen where you enter information or where calculated information displays (Chapter 3 *UG*, 7 *RG*).

Field entry
A number(s) or character(s) you have typed into a field (Chapter 3 *UG*, 7 *RG*).

Field parameters
The field format or data type; a limitation on what type of data you can enter into a particular field. For example, a Priority field only accepts a numeric entry (Appendix A *RG*).

File (or disk file)
Data or a program stored on a disk under its own filename (Chapter 3 *UG*, 2 *RG*).

Filename extension (or file type)
A period (.) and a one-to-three character extension to a filename. CA-SuperProject assigns a default extension .PJ to any filename without an extension when you save the file. You can specify another default extension on the Preferences,General Options dialog box (Chapter 3 *UG*, 2 *RG*).

Find
A Select menu command that lets you locate a specified record (Chapter 2 *RG*).

Finish delay (Finish Del)
Any delay in the finish of a task, caused by a resource assignment that is longer than the task's duration (Chapter 6 *UG*, 7 *RG*).

Finish On/Before/After
Task Type options that are tied to Must Finish=, Must Finish<, and Must Finish> dates, respectively, based on the Must flag (Chapter 5 *UG*, 2 and 7 *RG*). ***See also*** Must Flag.

Finish-to-Finish link
A link tying one task's finish to its predecessor's finish (Chapter 5 *UG*, 3 and 4 *RG*).

Finish-to-Start link
A link tying one task's start to its predecessor's finish (Chapter 5 *UG*, 3 and 4 *RG*).

Fixed cost
A one-time cost incurred by an assignment (for example, the cost of materials) as opposed to variable costs, which depend on the number of hours a resource works (Chapter 6 *UG*, 7 *RG*).

Float
The amount of working time a task can be delayed before it becomes a critical task, where further delay postpones the Project Scheduled Finish. Also when the amount of delay violates a Must condition. Float includes Free Float (Chapter 6 *UG*, 7 *RG*).

Fonts
The typefaces used to print text. The available fonts depend on the type of printer you are using. To see the current fonts being used, select Files,Print View from the menu. Fonts available for specific devices are shown in File,Printer Setup (Chapter 2 *RG*).

Free Float
The amount of time the task or assignment's Scheduled Start can slip before delaying another task or assignment (Chapter 6 *UG*, 7 *RG*).

Freeze
An option on the Project Details screen (**Ctrl – Z**) that shields a linked project from the changes you make to other projects (Chapter 6 *RG*).

Function keys
Keys that execute specific commands, such as F1, F2,...F10 (Chapter 2 *UG*, 1 *RG*).

Gantt chart
A graphic representation of task schedules along a timescale. The Gantt chart, which appears on the Outlines, is useful for comparing tasks in terms of time and scheduling (Chapter 7 and 8 *UG*, 3 *RG*).

General Options
Preference options that affect overall program operation. This dialog box displays with Preferences,General Options from the menu (Chapter 2 *RG*).

Go to Column
An Edit command that lets you select which column to move to on the Outlines and on the Assignment subwindows (Chapter 2 *RG*).

Hammock task
See Span.

Hard disk
See Disk.

Heading
Any task that has a group of tasks one level beneath it (Chapter 5 *UG*, 1, 3, and 4 *RG*).

Highlight
To make something visually distinct. For example, when you select a menu command, it appears as light letters against a dark background. *See also* Dimmed.

Histogram
See Cost/Resource Graph.

Histogram Symbols
The bars and symbols that make up the Cost/Resource chart, or Histogram. You can define the appearance of these symbols with Layout,Histogram Symbols from the menu (Chapter 6 *UG*, 3 *RG*).

Holiday
A nonworkday for a single resource or for all resources in a project. You can indicate holidays on the Project and Resource Calendars.

CA-SuperProject automatically schedules resources to not work on holidays. Only workdays are counted when calculating task durations, unless the Task Option is set to Elapsed (Chapter 5 *UG*, 5 *RG*).

Ignore Actual Dates
A Preferences,Calculation Options setting from the menu that causes scheduling to occur as if no Actual dates have been entered (Chapter 2 *RG*).

Import/Export
See Export/Import.

Include
A File command that copies all assignments, resources, holidays, tasks, and select criteria from one project to another (Chapter 2 *RG*).

Labor
Nonconsumable resources, usually personnel, that reduce the Scheduled Duration of Effort Driven tasks when more are added (Chapter 6 *UG*, 6 and 7 *RG*).

Lag
A wait period or minimum gap you can specify between dependent tasks. You can also enter Assignment lag (Start Delay), which is a minimum gap between the start of a task and the start of one of its assignments. You can either enter the lag duration in hours, days or weeks, or enter a percentage lag when linking tasks (Chapter 6 *UG*, 7 *RG*).

Late Finish (Late)
The latest date a task, assignment, or project can finish without affecting the critical path. The Late Finish is based on the Project Scheduled Finish, which is fed down to the last headings, tasks, and assignments in the project. For the other predecessor tasks, the Late Finish equals the successor task's Late Start (Chapter 7 *RG*).

Late Start
The latest date a task can start without delaying the Scheduled Finish of the project, calculated as the Late Finish – the Scheduled Duration (Chapter 7 *RG*).

Layout menu
A menu offering commands for creating, modifying, loading, saving, and displaying chart definitions, which control screen content and appearance (Chapter 6 and 8 *UG*, 2 *RG*).

Leader
The name of the project leader, which you enter on the Project Details (Chapter 7 *RG*).

Lead/Lag
See Lag.

Lead resource
The resource whose name appears in the PERT and Work Breakdown Chart Task box and appears first in the list on the Task Outline and Task Details.

You can assign many resources to a task; the lead resource has no specific priority over the other resources (Chapter 7 *RG*).

Level
A Resource Details option that includes the current resources in all project leveling. When not selected, it shields the current resource from all leveling operations (Chapter 6 *RG*).

Leveling
The process of resolving resource and schedule conflicts. When a resource is overscheduled, leveling "staggers" tasks to bring the workload within the workday limit. This process uses priority and float as criteria in deciding which assignments to delay. You can control leveling with the Leveling and Leveling Delays buttons on the Preferences,Calculation Options dialog box (Chapter 5 *UG*, 2 and 6 *RG*).

Leveling Delays
A Preferences,Calculation Options setting from the menu that controls whether CA-SuperProject delays assignments according to priority or float (Chapter 6 *UG*, 2 *RG*).

Likely (Like) Duration
Your best estimate of the task duration (Chapter 6 *UG*, 1 and 7 *RG*).

Link
A connection between two tasks that designates the dependency relationship between them. There are three dependency link types: Finish-to-Start, Start-to-Start, and Finish-to-Finish (Chapter 4 *UG*, 3 and 4 *RG*).

Linked Projects
Projects linked together to avoid overscheduling common resources.

After you link projects on the Project Details, CA-SuperProject treats them as a group. Use this feature with resource leveling to resolve cross-project resource conflicts (Chapter 6 *UG*, 6 *RG*).

Load
To enter a data file or a program into the computer memory. You can load projects with **File,Open** from the menu or layouts with **Layout,Load** from the menu (Chapter 3 *UG*, 1 and 2 *RG*).

Local Area Network
See Network.

Lock File
A **File,Local Area Network** command to prevent other users on a network from overwriting a file. Other users can load the file, but cannot save it with that filename (Chapter 2 and 9 *RG*).

Material
Resources which may be consumed, produced, or both. CA-SuperProject does not calculate Scheduled or Actual Resource Total Hours for material resources, and adding material resources will not reduce the duration of Effort Driven tasks (Chapter 6 *UG*, 6 and 7 *RG*).

Material Allocation
The rate and timing of material production or use (Chapter 6 *UG*, Chapter 7 *RG*).

Maximize arrow
The "up" arrow on the right side of the window title bar. When you click the arrow, the active window is enlarged to fill the entire screen.

Maximum Units
The number of units in a group resource, such as the number of employees in a department (Chapter 6 *UG*, 7 *RG*).

Memory Layout (Memory gauge)
A File menu selection (**File,View Memory Layout**) that shows how much computer memory (RAM) is available for projects (Chapter 2 *RG*).

Menu
A list of available program activities. Point with the mouse and click (or press **Enter**), or press Alt and the underscored letter(s) to pull down a menu from the menubar (Chapter 2 *UG*, 1 *RG*).

Menubar
The top horizontal line on the screen, showing the view, program, and project name, and the menus currently available (Chapter 2 *UG*, 1 and 2 *RG*).

Milestone
An important date or completion mark for your project; a zero-duration task (Chapter 5 *UG*, 4 *RG*).

Minimize arrow
The "down" arrow on the right side of the title bar. When you click the arrow, the active window is reduced.

Mouse
A small device you move around on a flat surface next to your computer. The mouse controls a pointer on the screen. You use the mouse in place of typing on the keyboard.

Must Finish
A date you enter to "force" a task, assignment, or project to end before, on, or after a given date (Chapter 4 and 5 *UG*, 7 *RG*).

Must Flag
A symbol indicating that you have entered a Must Start or Finish. There are three types of Must Flags:

> Means this event must occur on or after the associated date.

< Means this event must occur on or before the associated date (the default for Must Finish).

= Means this event must occur on the associated date (the default for Must Start) (Chapter 5 *UG*, 7 *RG*).

Must Start
A date you set to override the calculated Scheduled Start when external factors, such as deadlines or late delivery of materials, make that date unacceptable (Chapter 4 and 5 *UG*, 7 *RG*).

Negative Float
The amount of schedule conflict for a task, which occurs when the task's Late Finish is before its Scheduled Finish. Negative float is usually the result of conflicts between Must dates and precedence links (Chapter 6 *UG*, 7 *RG*). ***See also*** Start Delay.

Network
A component that lets many computers work from a central software/file/device base or dependency network (Chapter 9 *RG*).

Next Selected
A Select menu command that moves you to the next task, resource, or assignment. If you've selected or activated a subset, Next shows you the next item in that Select Criteria set (Chapter 2 *RG*).

Noncritical task
A task with float. You can delay the start of a noncritical task up to the amount of float time without affecting the Scheduled Finish of the project (Chapter 5 *UG*, 6 *RG*).

Non-graphic output
Typed, character output using standard U.S. ASCII characters (Chapter 6 *UG*, 2 *RG*).

Nonworkday
A day when a resource is not scheduled to work, which you can define on the Resource Calendar (Chapter 5 *UG*, 7 *RG*).

Note Text
The word-processing feature for the Task Outline or Task Details subwindow that allows you to make notes about tasks, schedules, assignments, and so on (Chapter 3 and 6 *RG*).

Object
An image that graphically represents an application, option, shape, concept, or a message. For example, there are several mouse pointer shapes that represent actions to take. There is also a CA-SuperProject object that you click on to access the program (Chapter 2 *UG*).

Open
To enter or load data or a program file into the computer memory (Chapter 3 *UG*, 2 *RG*).

Optimistic Duration (Opt)
The shortest anticipated duration for the completion of a task. There is a less than 1% chance that the task will finish earlier than this duration, which is three Deviations less than the Likely Duration (Chapter 5 *UG*, 6 and 7 *RG*).

Other
Nonlabor, nonconsumable resources, such as rental of equipment, facilities, computer time, and other similar resources charged at variable rather than flat rates. If you assign additional Other type resources to an Effort Driven task, you do not reduce its duration (Chapter 6 *UG*, 6 and 7 *RG*).

Outline
A screen showing a hierarchical organization of tasks and assignments, with various columns that show totals and schedules. CA-SuperProject offers four Outlines, organized by task, date, resource, and account (Chapter 5 *UG*, 3 *RG*).

Output
Information transferred from a computer to some external destination, such as a printer (Chapter 4 and 5 *UG*, 2 *RG*).

Overassigned
See Conflict.

Overhead Cost
The cost of overhead or maintenance and administrative costs for the task, assignment, or project, calculated as Overhead Multiplier × Variable Cost (Chapter 6 *UG*, 7 *RG*).

Overhead Multiplier
The factor used to calculate the Overhead Cost (Chapter 6 *UG*, 7 *RG*).

Overscheduled
See Conflict.

Overtime Cost
The cost of overtime for the assignment or project, calculated with the Overtime Multiplier (Chapter 5 *UG*, 7 *RG*).

Overtime Hours
See Resource Overtime Hours.

Overtime Multiplier
The factor used to calculate the resource's overtime rate and Overtime Cost (Chapter 6 *UG*, 7 *RG*).

Partial Workday
A day when a resource can only work part of the scheduled workday, entered on the Resource Details or Calendar (Chapter 5 *UG*, 5 *RG*).

Password
See Project Password.

Path
The sequence of directory names describing the location of a given directory (for example, \DOS\SPJWIN\DEVELOP.PJ). When specifying the location of a new project or file, be sure to include the path if appropriate. See your operating system manual for details (Chapter 3 *UG*).

Percent Complete (% Complete)
(Actual Resource Total Hours × 100) ÷ Scheduled Resource Total Hours, which shows you how close the task or assignment is to finishing. You can also enter this value (Chapter 7 *RG*).

Personal Nonworkdays
A holiday for an individual resource, set on the Resource Calendar (Chapter 5 *UG*, 5 *RG*).

PERT Chart
A visual representation of your project as a series of linked tasks. The PERT (Program Evaluation and Review Technique) Chart shows you the tasks in sequence and in relation to one another (Chapter 5 *UG*, 4 *RG*).

PERT Probability
Estimations that a task duration will match, exceed or fall short of the Likely Duration (Chapter 6 *UG*, 6 and 7 *RG*).

Pessimistic Duration (Pess)
The longest anticipated duration for the completion of your task. The Pessimistic Duration is the worst-case duration; it is three deviations beyond the Likely Duration, and the chance that the task will take longer than this duration is less than 1% (Chapter 6 *UG*, 6 and 7 *RG*).

Pessimistic Finish Date (PessFin)
The latest date the project can finish; the Project Scheduled Finish – 2 × Project Standard Deviation. The project has a 97.7% probability of finishing by this date (Chapter 7 RG). ***See also*** Standard Deviation.

Phase
The first or highest level of a project when you use the order: "phase, heading, task" in your project structure (Chapter 4 *UG*, 4 RG).

Planned
See Baseline.

Planned Cost
See BCWS.

Point
To position the mouse pointer on the object you want to select.

Pointer
A small arrow on the screen that follows the movements of the mouse or shows where your next action will take place.

Precedence
A relationship between two tasks in which one follows another (Chapter 4 *UG*, 4 *RG*).

Predecessor
A task that occurs before another task, according to dependency links. With a Finish-to-Start link, the predecessor must finish before the succeeding task starts (Chapter 4 *UG*, 3, 4, and 7 *RG*).

Predefined report
A ready-made report format or layout included with CA-SuperProject. You can select from over 20 predefined reports when you use **F**ile,Print **R**eports from the menu (Chapter 6 *UG*, 2 and 3 *RG*). ***See also*** Layout menu.

Preferences menu
A menu offering option screens and field groups for tailoring the program to your needs (Chapter 3 *UG*, 2 *RG*).

Previous
A Select menu command or tool bar button that displays the previous task, resource, or assignment. If you've activated a Select Criteria set, Previous shows you the previous record in that subset (Chapter 2 *RG*).

Print View
A File option that outputs all or a portion of the current screen (Chapter 6 *UG*, 2 *RG*).

Priority (Pr)
A level you enter to indicate the relative importance of an assignment or task. The Priority level is critical for resource leveling by priority first (with the Leveling Delays option on Preferences,Calculation Option dialog box set to By Priority). Task and heading priorities override default assignment priorities. Entering a priority of 0 (zero) protects a task or assignment from leveling (Chapter 4 *UG*, 7 *RG*).

Project
A sequence of tasks performed to achieve an objective; a planned undertaking that involves assigning resources to tasks according to a prescribed schedule and budget (Chapter 1 and 4 *UG*, 1 *RG*).

Project Calendar
A date screen where you can enter the holidays or nonworkdays applicable to all resources or tasks (Chapter 5 *UG*, 5 *RG*).

Project Description
An elaboration on the project purpose or name (Chapter 7 *RG*).

Project Details
A screen for entering information about a project; linking projects and subprojects (Chapter 6 *UG*, 6 *RG*).

Project Holidays
Project-wide holidays set on the Project Calendar to give all resources and tasks a nonworkday (Chapter 5 *UG*, 5 and 7 *RG*).

Project ID
An identification number that is applied sequentially to all projects (Chapter 7 *RG*).

Project Name
The name of the project (the default is PROJ-N.PJ.). The program appends the extension .PJ to your entry (unless you specify a different extension on the **Preferences,General Options** dialog box), and stores it under this name in the specified drive and directory (Chapter 3 *UG*, 7 *RG*).

Project Password
A number you can enter to protect your project from unauthorized access. A password prompt appears each time you load the project (Chapter 4 and 5 *RG*).

Project Workday
The standard project workday, defined for each day of the week on the Project Details screen (Chapter 6 *UG*, 6 and 7 *RG*).

Promote
To move a task or heading up one level in the project structure (Chapter 5 *UG*, 4 *RG*).

Prompt
A request by the program for additional information or a response (Chapter 3 *UG*, 1 *RG*).

Protected field
A field you can not change, containing calculated data (Chapter 3 *UG*, 1 *RG*).

Pulldown menu
Selections on the menubar that are "rolled up" until you need them (Chapter 2 *UG*).

Radio buttons
Sets of options marked with circles in a dialog box. Select an option by pointing to it and clicking the mouse or pressing **Spacebar**. When a radio button is solid, it is selected. When it is an open circle, it is not selected (Chapter 3 *UG*, 1 *RG*).

Rate
The hourly cost, pay, or charge rate of the resource for a specified time range for Labor or Other resources, or the unit cost for materials (Chapter 6 *UG*, 7 *RG*).

Regular Cost
The cost of Resource Regular Hours for the assignment; Resource Regular Hours × Rate (Chapter 5 *UG*, 7 *RG*).

Regular Hours
See Resource Regular Hours.

Remaining Duration
The amount of time left in the project; Scheduled Duration –Actual Duration (Chapter 7 *RG*).

Remaining Duration as a Percent of Baseline Duration
Remaining Resource Total Hours × 100) ÷ Baseline Total Hours (Chapter 7 *RG*).

Remaining Resource Total Hours
The hours not yet worked on the project. The Scheduled Resource Total Hours – Actual Resource Total Hours—may also be in minutes, days, weeks, months, and years (Chapter 7 *RG*).

Remaining Total Cost
The total costs remaining for the project, task, resource, account, or assignment; the Total Cost – the Actual Total Cost (Chapter 7 *RG*).

Report Generator
The combination of Layout, Select, and **F**ile,Print **R**eports options from the menu that let you generate columnar reports (Chapter 6 *UG*, 2 *RG*).

Resource
A piece of equipment, an employee, a department, a consultant, or any other entity you assign to a task, including materials (Chapter 1, 4, and 6 *UG*, 6 and 7 *RG*).

Resource Calendar
A date screen where you can enter each resource's nonworkdays (such as vacation and sick days), which CA-SuperProject uses in resource scheduling (Chapter 5 *UG*, 5 *RG*).

Resource conflict
When a resource is overscheduled; its workload exceeds its workday limit (Chapter 5 *UG*, 7 *RG*).

Resource Conflict Hours
The hours over the workday limit that the resource is scheduled to work—may also be in minutes, days, weeks, months, and years (Chapter 6 *UG*, 7 *RG*).

Resource Description
An elaboration of the resource name, such as address, location, phone number, and so on (Chapter 7 *RG*).

Resource Details
A screen containing the resource name, workday schedule, all assigned tasks, and other information for individual resources (Chapter 6 *UG*, 6 *RG*).

Resource Driven
A Task Option that causes resource work to drive the schedule so the task finishes when the resource's work finishes (Chapter 5 and 6 *UG*, 7 *RG*).

Resource Efficiency Factor
A percentage you can use to indicate relative resource efficiency where 100% is standard efficiency for the entered number of hours (some people could have a factor of over 100%). A resource with an Efficiency Factor of 100% can do the job twice as fast as one whose Factor is 50% (Chapter 7 *RG*).

Resource Histogram
A timeline bar graph on the Resource Outline that shows how overscheduled or underscheduled a resource is; a type of Cost/Resource chart (Chapter 6 *UG*, 3 *RG*). ***See also*** Cost/Resource Chart.

Resource leveling
The process of resolving resource conflicts by delaying tasks. When a resource is overscheduled (the workload exceeds the workday limit) you can "stagger" tasks to unburden the resource (Chapter 5 *UG*, 2 *RG*). ***See also*** Leveling.

Resource Name
The name you use to identify a resource (Chapter 5 *UG*, 7 *RG*).

Resource Outline
A screen that shows a list of your project's activities in Outline format and in resource arrangement (Chapter 5 *UG*, 3 *RG*).

Resource Overtime Hours
The hours over the Regular Hours (specified on the Resource Calendar or on the Resource Details Work Hours subwindow) that the resource is scheduled to work—may also be in minutes, days, weeks, months, and years (Chapter 6 *UG*, 7 *RG*).

Resource Regular Hours
Scheduled hours within the resources' Standard Workday, which cannot be counted as overtime or conflict hours (Chapter 5 *UG*, 7 *RG*).

Resource scheduling
The act of assigning resources to tasks so they complete on time (Chapter 5 *UG*, 2 *RG*).

Resource Type
A field where you can specify whether a resource is Labor, Material, or Other; this field affects allocations and costing (Chapter 6 *UG*, 7 *RG*). ***See also*** Labor, Material, and Other.

Resource workday lengths
The maximum number of hours that a resource is scheduled to work each workday, indicated on the Resource Details or Resource Calendar (Chapter 5 *UG*, 5 and 6 *RG*).

Restore arrow
The object with up and down arrows on the right side of the title bar (next to the maximize arrow) that appears after you have enlarged a window with the maximize arrow. Clicking the restore arrow returns the window to its default size.

Return to Superproject
A File,subProjects menu command that takes you from a subproject to the main project (Chapter 2 *RG*).

Revised
The operating system date of the last revision, plus the number of the revisions you have made (Chapter 7 *RG*).

"Rolled up" tasks, headings and resources
A task, heading, account, or resource hidden beneath a higher heading, task, or resource (Chapter 5 *UG*, 3 and 4 *RG*).

Save
To store information by transferring it from main memory (RAM) to a disk. Work not saved disappears when you quit CA-SuperProject, turn off the computer, or power is interrupted.

Schedule Variance
Earned Value (BCWP) or Budgeted Costs of Work Scheduled (BCWS) (Chapter 6 *UG*, 7 *RG*).

Schedule Variance Percent
(Schedule Variance × 100) ÷ Budgeted Costs of Work Scheduled (BCWS) (Chapter 7 *RG*).

Scheduled Duration
The calculated duration; the length of time between the Scheduled Start and Finish. (Chapter 5 *UG*, 7 *RG*). See also Duration.

Scheduled Performance Index Percent
(Assignment Budgeted Cost of Work Performed (BCWP) × 100) ÷ Budgeted Cost of Work Scheduled (BCWS) (Chapter 7 *RG*).

Scheduled Resource Total Hours
The hours required for resources to complete an assignment, task, or project. CA-SuperProject also displays resource minutes, days, weeks, months, and years (Chapter 5 *UG*, 7 *RG*).

Scheduled (Schd) Start/Finish
Dates when the assignment, task or project is scheduled to begin or end (Chapter 5 *UG*, 7 *RG*).

Scroll
To move displayed material across the screen, to see records not currently shown (Chapter 3 *UG*, 3 *RG*).

Scroll arrow
An arrow at either end of a scroll bar, used to display another part of the windows, or to scroll a list of file names.

Scroll bar
A rectangular bar that appears in windows. Clicking or dragging in the box in the scroll bar displays other parts of the window.

Scroll box
The white box in a scroll bar, used to change the value of the related dialog box element or to scroll a list of file names.

Select
To choose a menu option or highlight an item on the screen. For example, when you select a setting on the General Options screen, the item is highlighted to indicate your selection (Chapter 2 *RG*). ***See also*** Selected items.

Select Criteria
The feature you can use to define subsets of tasks, resources, assignments, or accounts for display (Chapter 2 *RG*).

Selected items
Tasks, resources, assignments, or accounts you have selected (defined as a subset) with Enter Criteria or select One Object from the Select menu, or with F7.

You can select many items, including the current item. You can move, print, display, or transfer only selected items, if desired. The PERT and WBS Layout settings determine how selected tasks display on those charts (Chapter 2 *RG*).

Select menu
A menu of commands for highlighting objects for moving, deleting, including in other projects, and so on (Chapter 2 *RG*).

Settings
Preference controls for program features and operations (Chapter 3 *UG*, 2 *RG*).

Slack
See Float.

Smoothing
A setting for the Leveling option on the Calculation Options dialog box that solves resource conflicts by absorbing available float. (Chapter 6 *UG*, 2 *RG*).

Sorting Sequences
The sequence in which information is sorted for display, output, or transfer (Chapter 6 *UG*, 3 and 8 *RG*).

Span
A Duration Option which causes CA-SuperProject to set all Free Float and Start Delay to zero, then calculate the duration of a task as the difference between the latest Scheduled Finish of all predecessor tasks and the earliest Scheduled Start of all successor tasks (Chapter 6 *UG*, 7 *RG*).

Standard Days/Month
The number of days the resource works in an average month (Chapter 7 *RG*).

Standard Days/Week
The number of days the resource works in a standard workweek (Chapter 7 *RG*).

Standard Deviation (SD)
A standard amount of uncertainty in the task's or project's duration (Chapter 6 *UG*, 7 *RG*).

Standard Hours/Day
The normal number of hours the resource works each workday, used in Resource Total Hours calculations (Chapter 6 *UG*, 7 *RG*).

Standard Shift
The normal daily working hours for resources (Chapter 6 *UG*, 6 and 7 *RG*).

Start Delay (Delay)
The amount of time a task is postponed. To create Start Delay, enter a number in the Start Delay field or let the program calculate it as Must Start – Scheduled Start.

If Reset Delay Before Calculation is selected on the **P**references,**C**alculation Options dialog box, Start Delay cannot be edited and delay will be deleted before schedules are calculated again (Chapter 6 *UG*, 7 *RG*).

Start On/Before/After
Task Type options that are tied to Must Start=, Must Start<, and Must Start> dates, respectively, based on the Must flag (Chapter 5 *UG*, 2 and 7 *RG*). ***See also*** Must flag.

Start-to-Start link
A task relationship in which the start of one task depends on the start of another task (Chapter 5 *UG*, 3, 4, and 7 *RG*).

Status
An non-edit field that indicate the task's current condition: Scheduled, In Progress, Interrupted, Done, Critical, Conflict, or Negative Float (Chapter 7 *UG*, 6 and 7 *RG*).

Subproject
A project included in another project, represented by a connected task. You can include other subprojects within a subproject. You can define subproject box appearance with Layout,Box Styles from the PERT or WBS charts menus (Chapter 6 *UG*, 2 and 4 *RG*).

Subset
A group of resources, assignments or tasks defined by Select Criteria. Items within a subset have common elements; for example, you can define a subset of all assignments using a specified resource, or all tasks beginning on a certain date (Chapter 2 *RG*).

Subwindow
A scrollable portion of the Details and Calendars that shows workday schedules, assignments, or notes, which you can display with Layout,View Subwindows from the menu (Chapter 6 *UG*, 5 and 6 *RG*).

Successor
A task that occurs after another linked task. With tasks linked Finish-to-Start, the successor task starts after the preceding task finishes (Chapter 5 *UG*, 3, 4, and 7 *RG*).

Superproject
Any project that contains one or more subprojects (Chapter 6 *UG*, 2 *RG*). ***See also*** Subproject.

Symbol
A graphic character representing task activity on the Gantt window of the Outlines. You can define Gantt symbols with Layout,Bar Symbols from the menu (Chapter 6 *UG*, 3 *RG*).

System holidays
A set of holidays you can define on the Project Calendar and save as defaults for future projects (Chapter 5 *UG*, 5 *RG*).

System/Screen Colors
Preference and Windows settings that control CA-SuperProject colors (Chapter 2 *RG*).

Task
An activity or function that is a building block of a project (Chapter 1 and 4 *UG*, 1 and 3 *RG*).

Task Description
An elaboration of the task/heading name; up to 56 characters (Chapter 7 *RG*).

Task Details
A screen for each task, available in Expert mode, that contains the task name, subprojects connected to the task, durations, start/finish dates, costs, and so on (Chapter 6 *UG*, 6 *RG*).

Task ID
An editable identification number CA-SuperProject applies sequentially to all tasks (Chapter 5 *UG*, 7 *RG*).

Task Name
The unique name you've assigned to a task. The default name is Task-*n* (Chapter 5 *UG*, 7 *RG*).

Task Option
A setting that determines whether assignment durations are Effort Driven, Elapsed, Workday Driven, Resource Driven, or Span (Chapter 5 and 6 *UG*, 7 *RG*).

Task Outline
A screen showing a list of your project's activities in outline format and in current Work Breakdown Structure arrangement (Chapter 5 *UG*, 3 *RG*).

Task Type
A field that indicates whether the task should start as soon as possible (ASAP), as late as possible (ALAP), or on, before, or after a specific date (Start On, Start Before, Start After, Finish On, Finish Before, Finish After, or Work Between) (Chapter 6 *UG*, 7 *RG*).

Template
A blank project or layout with the structure already in place so you can fill in the details (Chapter 6 *RG*).

Timescale
A horizontal "calendar" of time increments on the Gantt chart, which can represent hours, days, or several days (Chapter 6 *UG*, 3 *RG*).

Title bar
The horizontal bar at the top of a window that shows the name of the window's contents. You can move the window by dragging the title bar.

To Next Layout
A Layout menu command that displays the next layout on the list for the current screen (Chapter 2 *RG*).

Toggle
To choose between alternate conditions, such as On/Off, Yes/No, by pressing a certain key combination.

Tool bar
The line under the menu bar that appears with each View screen. The tool bar contains buttons that perform actions on the information you are viewing.

Total Cost (Tot)
The cost of the assignment, project, or task. Assignment Total Cost is the sum of the assignment's Variable, Fixed and Overhead Costs. Task Total Cost is the sum of the task's Assignment Total Costs. Project Total Cost is the sum of all Task Total Costs (Chapter 6 *UG*, 7 *RG*).

Tracking/Actuals fields
Expert mode fields for tracking progress (in terms of resource hours, cost, and percent complete of projects in progress)Ðthese fields add on to Advanced Planning and Baseline Compare fields (Chapter 7 *UG*, 2 and 7 *RG*).

Transfer to Baseline
An Edit menu command that sets the project baseline for comparison with scheduled and actual activity (Chapter 6 *UG*, 3 and 6 *RG*).

Underscheduled Hours
The number of work hours resources not assigned to tasks; the difference between available hours (based on resource workdays) and remaining resource hours (Chapter 7 *RG*).

Units Assigned
The number of units the assignment uses. For example, if your resource is a fleet of trucks or group of carpenters, you can enter the number of trucks or carpenters for the task or assignment into this field on the Resource Details, in Rates/Units or Assignments view. (Chapter 5 *UG*, 7 *RG*).

Unlock File
A command to remove the write exclusion on a locked file when using CA-SuperProject on a network, allowing other users to save the file (Chapter 2 and 9 *RG*).

Unselect All
A Select menu command to deactivate a Select Criteria subset, letting you work with all of the records in the project rather than only the selected subset (Chapter 2 *RG*).

Update Subprojects
A File,Subprojects menu command to make all subproject schedules current after you have made changes to the superproject (Chapter 2 *RG*).

User Defined Fields
A fixed number of fields where the user can create formulas, reference other User Defined Fields and data fields, and enter titles using the Edit,Project Formulas command. There are five fields for the following data types: Text, Integer, Currency, Start Date, Finish Date and Flag.

VAC
Variance at Completion. The difference between Baseline and Actual Total Costs (Chapter 6 *UG*, 7 RG).

Variable Cost
A cost that may change depending on the number of hours a resource works (Regular Cost – Overtime Cost) for Labor or Other resources or on the number of units for Material resources (Chapter 6 *UG*, 7 *RG*).

View Memory Layout
See Memory Layout.

View Screen
Different ways to view your data. The View screens are: Task Outline, Resource Outline, Date Outline, PERT Chart, Work Breakdown Chart, Account Outline, Details Screens, and Calendars (Chapter 1 *UG*, 2 *RG*).

WBS Chart
See Work Breakdown (WBS) Chart.

WBS Code
A code you can define to reflect a task's position in the project's Work Breakdown Structure or hierarchy (Chapter 6 *UG*, 6 and 7 *RG*).

WBS Mask
A template that defines the format of the WBS code for a particular project (Chapter 6 *UG*, 6 and 7 *RG*).

Wildcard characters
A star (*) or a question mark (?) symbol you can use in a filename search to show a group of files.

Window
The rectangular area on your screen in which you view an application. You can also have multiple windows to view different portions of a project, different View screens of a project, or different projects on the same screen.

Window application
An application designed especially for Microsoft Windows that uses Windows conventions such as pulldown menus and dialog boxes.

Work Between
A Task Type option that schedules the task between a Must Start > and Must Finish <. You can only set both Must dates if you have selected this option (Chapter 6 *UG*, 7 *RG*).

Work Breakdown (WBS) Chart
A screen that graphically shows the organizational layout of a project (Chapter 5 *UG*, 4 *RG*).

Work Breakdown Structure (WBS)
A method of grouping tasks in a project. A Work Breakdown Structure (WBS) is useful for organizing tasks by phases or items to be delivered (Chapter 5 *UG*, 3, 4, and 6 *RG*).

Workday
A day during which work can occur. You can define project nonworkdays (weekends and holidays) on the Project Calendar and enter the work hours for each day of the week (for example, 8 am to 5 pm) on the Project Details.

On individual resource calendars, you can change project work days to resource nonworkdays or exemption days, and change project holidays to resource workdays (Chapter 5 *UG*, 5 and 6 *RG*).

Workday Driven
A Task Option which causes the workday time of the task, not the resource work, to drive the schedule (Chapter 6 *UG*, 7 *RG*).

Workday length
The number of hours in each workday (standard shift) for each day of the week (Chapter 5 *UG*, 7 *RG*).

Workday limit
The maximum number of hours a resource is available to work each day. For Labor resources this is probably eight hours; for Materials and Other resources, the workday is the number of hours each unit is available for work each day (Chapter 5 *UG*, 5 and 6 *RG*).

Workday Start/Finish
The hour of the day the resource usually begins and ends work (Chapter 5 *UG*, 6 *RG*).

Workweek
The number of hours the resource works on each day of the week, including the start hours, standard hours per day, and maximum work hours per day (Chapter 5 *UG*, 5 and 6 *RG*).

Zoom In on Subproject

A File,Subprojects menu command that takes you to a connected subproject within a project (Chapter 2 *RG*).

Zoom into Details

View commands from the tool bar, the menu, or by pressing **Ctrl – Z**, that shows a Details screen for the currently highlighted project, resource, or task (Chapter 6 *UG*, 2 *RG*).

Appendix C
Related Reading

These books can give you a deeper understanding of the theory and practice of project management:

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